

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

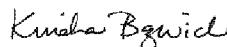
EPA MRID Number 51017504

**Data Requirement:** PMRA Data Code: 9.8.4 (TGAI) or 9.8.6 (EP)  
EPA DP Barcode: N/A  
OECD Data Point: IIA 8.12 (TGAI) and IIIA 10.8.1.1 (EP)  
MRID: 51017504  
EPA Guideline: 850.4150

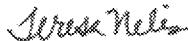
**Test material:** Clarity® formulation (a.i. Dicamba DGA salt) Purity: 39.6% a.e. (w/w); 480 g/L  
Roundup PowerMax® formulation (a.i. Glyphosate potassium salt) Purity: 39.74% a.e. (w/w); 540 g/L

Common name: Dicamba DGA and Glyphosate  
Chemical name: IUPAC: 3,6-Dichloro-o-anisic acid-2-(2-aminoethoxy)ethanol (Dicamba DGA)  
N-(phosphonomethyl)glycine (Glyphosate)  
CAS name: 2-(2-Aminoethoxy)ethanol;3,6-dichloro-2-methoxy-benzoic acid (Dicamba DGA)  
N-(phosphonomethyl)glycine (Glyphosate)  
CAS No.: 104040-79-1 (Dicamba DGA salt)  
70901-12-1 (Glyphosate potassium salt)  
Synonyms: Diglycolamine salt of 3,6-dichloro-o-anisic acid

**Primary Reviewer:** Kindra Bozicevich  
Senior Scientist, CDM/CSS-Dynamac JV

  
**Signature:** *Kindra Bozicevich*  
**Date:** 4/1/20

**Secondary Reviewer:** Joan Gaidos  
Senior Scientist, CDM/CSS-Dynamac JV

  
**Signature:** *Joan Gaidos*  
**Date:** 4/9/20

**Primary Reviewer:** Frank T. Farruggia, Ph.D.  
Senior Scientist, EPA/OPP/EFED/ERB-1

  
**Date:** 5/20/20 **2020.10.26**  
**Date:** 10:49:15 -04'00'

**Secondary Reviewer(s):** {.....}  
(EPA/OECD/PMRA)

**Date:** {.....}

This Data Evaluation Record may have been altered by the Environmental Fate and Effects Division subsequent to signing by CDM/CSS-Dynamac JV personnel. The CDM/CSS-Dynamac Joint Venture role does not include establishing Agency policies.

Reference/Submission No.: {.....}

**Company Code:** {.....} [For PMRA]  
**Active Code:** {.....} [For PMRA]  
**Use Site Category:** {.....} [For PMRA]  
**EPA PC Code:** 128931 (for Dicamba DGA salt)

Date Evaluation Completed: 20-5-2020

**CITATION:** Horn, T. 2019. Potential Effects of Clarity® + Roundup PowerMax® on Soybean Plants when Applied at Low Application Rates in the Field in Mississippi. Unpublished study performed by Stoneville R&D, Inc., Greenville, Mississippi; Eurofins EAG Agroscience, LLC, Columbia, Missouri; and Monsanto Company, Chesterfield, Missouri. Eurofins EAG Study No. 89275. Monsanto Study No.: STV-2019-0214. Report No.: MSL0031006. Study sponsored by Monsanto Company, Chesterfield, Missouri. Study initiated April 30, 2019 and completed January 14, 2020.

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

## SUMMARY:

The effect of Clarity® formulation (a.i. Dicamba DGA salt) + Roundup PowerMax® formulation (a.i. Glyphosate potassium salt) + Adjuvant Intact™ on the growth and reproduction of dicot (dicamba non-tolerant/glyphosate-tolerant soybean, *Glycine max*; var. NK S-45-W9) crops was studied in a soybean yield study. Nominal concentrations ranged from 0.00030 to 0.0048 lb ae dicamba/A and 0.000675 to 0.0108 lb ae glyphosate/A in the spray tank solution. The test concentrations of dicamba and glyphosate were analytically confirmed at all treatment levels, and nominal and measured application rates are provided in Table 3.

The study was conducted in a field located in Greenville, Mississippi (soils: sandy loam, pH 7, organic matter 1%).

The study targeted application during two developmental growth stages, early vegetative growth stage (V4) and flowering reproductive stage (R2). The treatment field was divided into two equal fields with 24 replicate plots for each test; non-dicamba tolerant soybeans were planted on May 31, 2019. The test solutions were applied to the respective field on June 27, 2019 and July 11, 2019 for the vegetative growth test and the reproductive test, respectively. On 14 and 28 days after treatment (DAT), soybean plants were measured for height and assessed for visual morphology. Soybean plants were later harvested for determination of yield for both studies.

When compared to the negative control plants, significant inhibitions in soybean plant height were found for both the vegetative growth and reproductive stages. For both stages, significant inhibitions in soybean height were found at 0.00031 lb ae dicamba/A and higher.

When compared to the negative control plants, significant inhibitions in soybean yield were found for both the vegetative growth and reproductive stages. For the vegetative growth stage, significant inhibitions in soybean yield were found at 0.00063 lb ae dicamba/A and higher. For the reproductive stage, significant inhibitions in soybean yield were found at 0.0013 lb ae dicamba/A and higher.

Dry weight and survival were not tested in either of the two tests.

Comparisons across the IC<sub>25</sub> estimates suggests similar response levels for plant height across vegetative and reproductive phase exposures and observation periods (14DAT or 28DAT). The most sensitive endpoint was based on 28DAT height in the reproductive stage, with NOAEC and IC<sub>25</sub> values of <0.00032 and 0.00163 lb ae/A dicamba, respectively (corresponding to a NOAEC and IC<sub>25</sub> of <0.0006 and 0.00309 lb ae/A glyphosate, respectively). Significant effects were observed at all application rates for all tests.

Reported visual signs of injury (VSI) included leaf cupping, epinasty of both stems and petioles, and some stunting and were readily apparent and significant (>20%) at all application rates the vegetative growth and reproductive stage study. In the reproductive stage study, in addition to vegetative injury, some pods were curled and there was compression of the main stem internodes. VSI was evaluated using logistic regression in Excel fit to observed VSI for each test dose. No hypothesis testing was evaluated to establish NOAEC/LOAEC endpoints. Regression equations provided in Figures 3 and 4 were used to estimate the %VSI for regression based IC<sub>x</sub> values for plant height and yield. Table 1b provides the observed (NOAECs) and estimated (IC<sub>x</sub>) average %VSI for each height and yield endpoint for 14DAT and 28DAT.

## Results Synopsis

A summary of the endpoints for height and yield are provided for dicamba (Table 1a) and glyphosate (Table 1c). Also provided in Figures 1a & 1b are the response relationships between height, VSI, yield, test concentration and evaluation time step. The average %VSI for each height and yield endpoint is provided in Table 1b. This study is scientifically sound and is classified as supplemental.

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504

**Table 1a. Summary of most sensitive parameters (lb ae/A Dicamba).**

Species	Stage	Endpoint	NOAEC	EC <sub>05</sub> /IC <sub>05</sub>	EC <sub>25</sub> /IC <sub>25</sub>
Soybean	Vegetative Growth	14-DAT Height <sup>1</sup>	<0.00031	0.000348	0.00170
		28-DAT Height <sup>1</sup>	<0.00031	0.000219	0.00207
		Yield	0.00031	0.000502	0.0263
	Reproductive	14-DAT Height	0.00059	0.000304	0.00236
		28-DAT Height <sup>1</sup>	<0.00032	0.000236	0.00163
		Yield	0.00059	0.00136	0.00677

<sup>1</sup> Significant effects at all application rates, indicating lowest test concentration did not bracket effects at the lowest concentration range, and range of application rates was inadequate to accurately determine sensitivity to the test material.

**Table 1b. Summary of Estimated Average % VSI at Endpoint Concentrations provided in Table 1a. (%)**

Species	Stage	Endpoint*	NOAEC	EC <sub>05</sub> /IC <sub>05</sub>	EC <sub>25</sub> /IC <sub>25</sub>
Soybean	Vegetative Growth	VSI 14-DAT Height	14	19	34
		VSI 28-DAT Height	15	8	37
		VSI Yield <sup>a</sup>	14 (14DAT) 15 (28DAT)	21.1 (14DAT) 18.6 (28DAT)	60.0 (14DAT) 70.5 (28DAT)
	Reproductive	VSI 14-DAT Height	27	19	44
		VSI 28-DAT Height	14	7	42
		VSI Yield <sup>a</sup>	28 (14DAT) 21 (28DAT)	37.0 (14DAT) 38.5 (28DAT)	56.6 (14DAT) 66.9 (28DAT)

\* Endpoints in Table 1a were used to a) provide the observed VSI at the NOAEC, and b) estimate the %VSI at height and yield IC<sub>x</sub> endpoints using logistic regression equations fit to study reported VSI on 14-DAT and 28-DAT.

<sup>a</sup> VSI was not assessed at the time of harvest, therefore %VSI for Yield is presented as the observed or predicted %VSI at 14DAT and 28DAT for the Yield endpoints in Table 1a.

**Table 1c. Summary of Parameters (lb ae/A Glyphosate).**

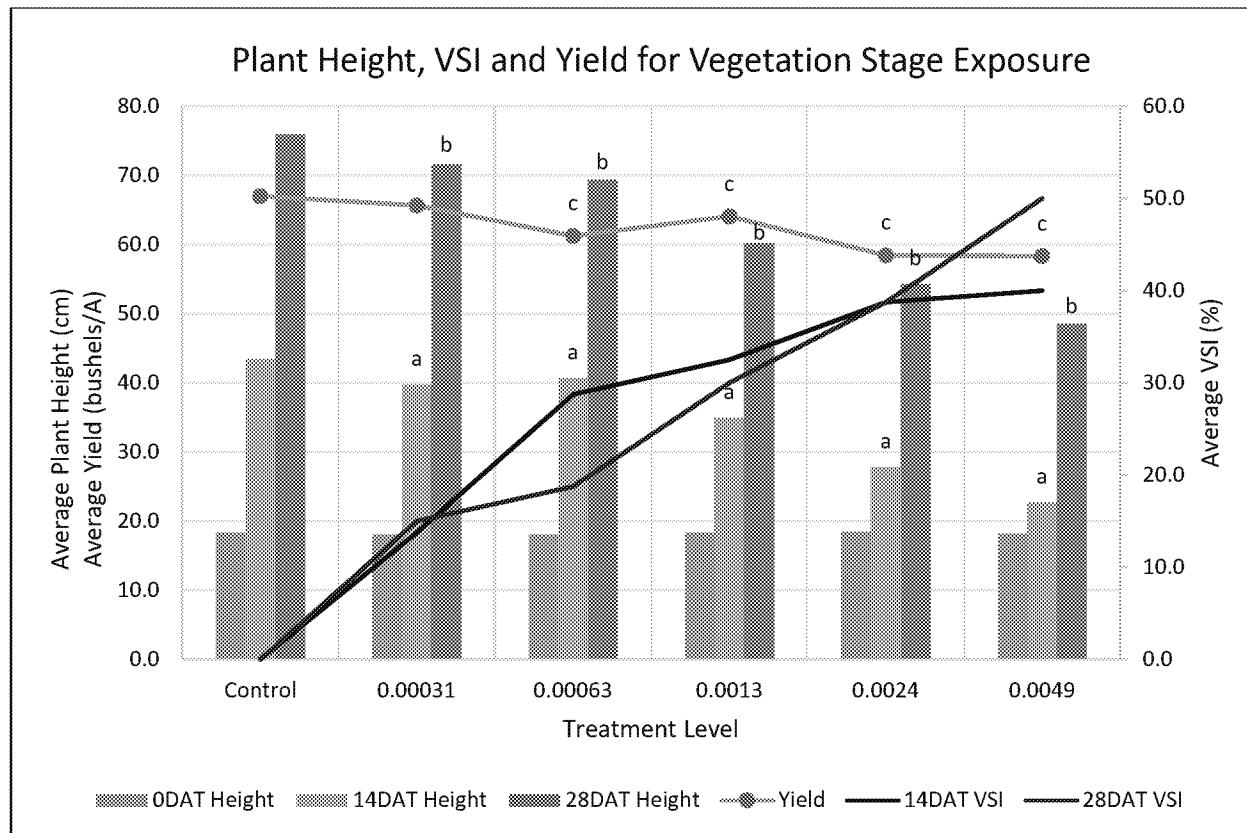
Species	Stage	Endpoint	NOAEC	EC <sub>05</sub> /IC <sub>05</sub>	EC <sub>25</sub> /IC <sub>25</sub>
Soybean	Vegetative Growth	14-DAT Height <sup>1</sup>	<0.00058	0.000547	0.00294
		28-DAT Height <sup>1</sup>	<0.00058	0.000357	0.00369
		Yield	0.00058	0.00087	0.0504
	Reproductive	14-DAT Height	0.0012	0.000545	0.00450
		28-DAT Height <sup>1</sup>	<0.0006	0.000432	0.00309
		Yield	0.0012	0.00238	0.0135

<sup>1</sup> Significant effects at all application rates, indicating lowest test concentration did not bracket effects at the lowest concentration range, and range of application rates was inadequate to accurately determine sensitivity to the test material.

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504



**Figure 1:** Relationship of plant height (Day 0, 14, 28), VSI (Day 14, 28) and yield (test termination) for the treatments applied during vegetative growth stages. Note: treatment levels with responses determined to be statistically different from the controls for day 14 height ("a"); day 28 height ("b"), and yield ("c") are indicated.

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

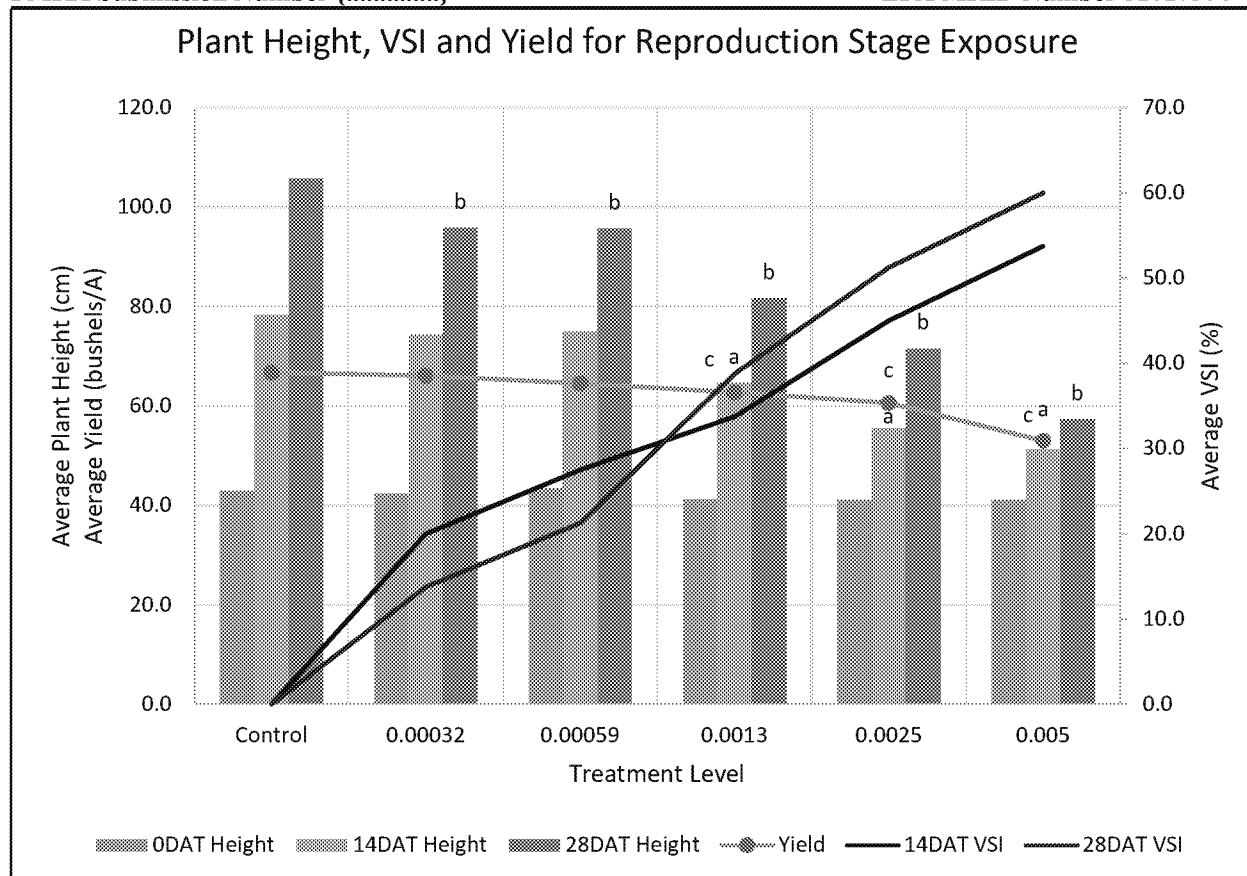


Figure 2: Relationship of plant height (Day 0, 14, 28), VSI (Day 14, 28) and yield (test termination) for the treatments applied during reproductive growth stages. Note: treatment levels with responses determined to be statistically different from the controls for day 14 height ("a"); day 28 height ("b"), and yield ("c") are indicated.

## I. MATERIALS AND METHODS

### GUIDELINE FOLLOWED:

This study was a non-guideline yield study. The reviewer evaluated the study methods according to OCSPP Guideline 850.4150: Vegetative Vigor. The following deviations were noted by the reviewer:

- For both the vegetative growth and reproductive portions of the study, the study author measured the height of five plants "selected non-systematically" within each row of the two center rows in each replicate plot for a total of 10 plants prior to treatment, 14 DAT and 28/29 DAT (p. 20).

OCSPP guidance recommends that the integrity of the replicate should be maintained throughout the duration of the study. In this study, plant height was determined for ten different plants at each measurement. The reviewer suggests that this sampling method is inadequate and introduces unnecessary variability into the study results that should have been more systematically controlled.

- Control plots were located so that "no control plot would be adjacent to a plot receiving the highest application rate" (p. 17). The study authors assume there is no potential for drift to the control plots from the other lower applications.

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

Likewise, the vegetative growth test field and the reproductive test fields were adjacent and separated by at least 20 ft (6 m). The wind was from the south with a speed of 1-5 mph for the vegetative growth stage and from the north with a speed of 6-10 mph for the reproductive stage (Table 5, p. 29). The study authors assume there is no potential for drift to the vegetative growth plots from the reproductive study spray application on July 11, 2019.

3. The study author did not report inhibitions or NOAECs for height and yield data for the vegetative growth or reproductive study.
4. Survival of plants in each test plot was not determined. OCSPP guidance recommends measuring effects on survival as part of the vegetative vigor test.
5. “The soybean experiments were harvested at a single time, based on the maturity of plants in the control plots within each experiment” (p. 20). The maturity of the soybean crop at time of harvest was not reported or described.
6. No supplemental irrigation was applied during the study. Rainfall was recorded from approximately 6/1/19 to 9/1/19 and was measured in inches, but specific amounts were not reported.
7. The following soil property details were not reported: percent sand, silt and clay, percent organic carbon, CEC and moisture at 1/3 atm.
8. The study author did not provide seed supplier information and historical germination rates for the soybean varieties planted.
9. Light intensity and humidity at the field test site were not determined. Daily observations of any moisture stress were also not reported.
10. Limits of detection (LOD) were not reported for HPLC-UV analysis.
11. Certificate of Analyses for the test substances were not provided.
12. The physico-chemical properties of the test materials were not reported.
13. The NK S-45-W9 variety of soybean that was planted in the test plots for both the vegetative growth and reproductive study, is a non-Dicamba tolerant soybean. This variety was also selected because of its glyphosate-tolerance. It is uncertain if this genetically modified variety may have impacted dicamba effects compared to a non-genetically modified variety.

The deficiency and deviations did have an impact on the acceptability of this study.

**COMPLIANCE:** Signed and dated Good Laboratory Practices (GLP), Quality Assurance, and No Data Confidentiality statements were provided. This study was conducted in compliance with U.S. EPA 40 CFR Part 160 with the following exceptions: GPS coordinates, field pesticide history, maintenance practices performed on the test site prior to and during the trial, characterization of soil and soil data, collection of weather data, and equipment used for harvest that underwent non-GLP calibration and so plot weight and moisture data collection were GLP exceptions.

## A. MATERIALS:

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

1. Test Material: Clarity® formulation (a.i. Dicamba DGA salt)  
Roundup PowerMax® formulation (a.i. Glyphosate potassium salt)  
Intact™ drift reduction agent (<0.005% (v/v))

Description: Not reported

Lot No./Batch No.: Not reported

Purity: 39.6% (w/w); 480 g/L (Dicamba)  
39.74% (w/w); 540 g/L (Glyphosate)

Stability of compound under test conditions: Measured concentration of the test material in the tank mix yielded recoveries of 98-108% (n = 10) for dicamba and 80-92% (n = 10) for glyphosate. Stability was not determined.  
*(OECD recommends chemical stability in water and light)*

Storage conditions of test chemicals: Not reported

Table 2. Physical/chemical properties of Clarity® formulation (a.i. Dicamba DGA salt) + Roundup PowerMax® formulation (a.i. Glyphosate potassium salt)

Parameter	Values	Comments
Water solubility at 20°C	Not reported	
Vapor pressure	Not reported	
UV absorption	Not reported	
pKa	Not reported	
Kow	Not reported	

## 2. Test organism:

Dicotyledonous species: Soybean (*Glycine max*, Fabaceae; NK S-45-W9 (Dicamba-non-tolerant and glyphosate-tolerant soybeans)

Seed source: Not reported

Prior plant treatment/sterilization: Not reported

Historical % germination of seed: Not reported

Seed storage, if any: Not reported

## B. STUDY DESIGN:

### 1. Experimental Conditions

a. Limit test: None.

b. Range-finding study: None.

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

**PMRA Submission Number {.....}**

**EPA MRID Number 51017504**

c. Definitive Study

**Table 3. Nominal and Analytically Confirmed Test Application Rates (lb ae/A) for Soybean.<sup>1</sup>**

Nominal Rates		Analytically Confirmed Rates of Dicamba Adjusted for Measured Field Application Rates <sup>2,3</sup>	Analytically Confirmed Rates of Glyphosate Adjusted for Measured Field Application Rates <sup>2,3</sup>	
as Dicamba		Vegetative Growth Stage		
0 (negative control)	0 (negative control)	<0.00024 (<LOQ)	<0.00049 (<LOQ)	
0.0003	0.000675	0.00031	0.00058	
0.0006	0.00135	0.00063	0.0011	
0.0012	0.0027	0.0013	0.0022	
0.0024	0.0054	0.0024	0.0043	
0.0048	0.0108	0.0049	0.0092	
		Reproductive Growth Stage		
0 (negative control)	0 (negative control)	<0.00024 (<LOQ)	<0.00049 (<LOQ)	
0.0003	0.000675	0.00032	0.00060	
0.0006	0.00135	0.00059	0.0012	
0.0012	0.0027	0.0013	0.0024	
0.0024	0.0054	0.0025	0.0046	
0.0048	0.0108	0.0050	0.0099	

Data obtained from Table 1, p. 25 and Tables 8-9, pp. 32-33 in the study report.

<sup>1</sup> Treatments were tank-mixes of dicamba (Clarity®), glyphosate (Roundup PowerMax®), and Intact™, a drift reduction agent. Measured tank-mix concentrations for dicamba were 98.9-104.2% and 98.2-107.8% of nominal concentrations for the vegetative and reproductive experiments, respectively. Glyphosate concentrations were 80.0-85.8% and 85.7-91.8% of nominal concentrations for the vegetative and reproductive experiments, respectively.

<sup>2</sup> Measured tank concentrations were adjusted for measured field application rates (% of target GPA), and recoveries shown are based on analytical recoveries and field application rate recoveries and are rounded rates (DER Attachment 1).

<sup>3</sup> Actual GPA for the vegetative growth test ranged from 14.57-14.97 GPA (99.1-101.8%), with one exception of a lower application rate of 13.93 GPA (94.8%) for one replicate at 0.00060 lb ae/A (DER Attachment 1).

**Table 4: Experimental Parameters – Soybean Yield.**

Parameters	Soybean Yield	
	Details	Remarks
Duration of the test	28 days for each experiment	Plants were exposed at two different growth stages: early vegetative (V4) and reproductive at flowering (R2).
Number of seeds/plants/species/	10 plants/replicate	No effort was made to maintain the replicate. Plants measured for height were not tracked

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504

replicate		and therefore were not consistently evaluated across the sampling periods
Number of plants retained after thinning	Thinning not reported.	
<u>Number of replicates</u> Control: Adjuvant control: Treated:	4 N/A 4	4 control plots per the negative control; 4 treatment plots per test concentration
Number of test concentrations:	Five low dose tank-mix application (Treatments 1-5) and one negative control (Treatment 0; tank-mix water)	Stock solutions (1:100 dilutions) of Clarity®, Roundup PowerMax®, and Intact™ were prepared and used to individually mix each treatment.
<u>Method and interval of analytical verification</u>	Tank-mix samples were collected and analyzed using HPLC with UV detection for dicamba DGA (220 nm) and glyphosate acid (500 nm).	
LOQ:	0.00024 lb ae/A (dicamba) 0.00049 lb ae/A (glyphosate)	
LOD:	Not reported	
Adjuvant (type, percentage, if used)	Intact™ (Polyethylene glycol, choline chloride, guar gum), 0.5% v/v	
<u>Test container (plot)</u>  Size/Volume:	Each treatment area was arranged as a randomized complete block (RCB) design. Two adjacent treatment fields for the two tests were separated by an alley of at least 20 ft width. Each treatment field contained test plots arranged in 4 rows separated by 15 ft wide alleys, with 6 replicates per row. The 6 replicates per row were	Alleys between replicates (20 ft wide) were continuously planted with soybeans. Soybean borders (25.33 ft) surrounded both experimental plots.  No control plot was allowed to be adjacent to a plot receiving the highest application rate.
Material:		

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

**PMRA Submission Number {.....}**

**EPA MRID Number 51017504**

(glass/polystyrene)	separated by buffer rows that were not sprayed; 4 rows in the center of each replicate were sprayed. Row spacing was 38 inches with row length of 20 ft, for a total treated area of 253 ft <sup>2</sup> .  Not applicable	
Growth facility	Soybean field located in Greenville, Mississippi	
Method/depth of seeding	Soybeans were planted on May 31, 2019 for both experiments. The method of planting was not reported.	Prior to planting, a proper seedbed was prepared according to local agronomic practices, including tillage and herbicide applications.
<u>Test material application</u> Application time including the plant growth stage	Early vegetative growth stage: V4 Flowering reproductive stage: R2	Applies dates were 6/27/2019 for the vegetative growth stage and 7/11/2019 for the reproductive stage.
Number of applications	Single application, applied in 2 passes	
Application interval	N/A- single application for each experiment	
Method of application	The test material was applied using a backpack sprayer (CO <sub>2</sub> propellant) with 4 TeeJet® TTI nozzles (42 PSI) spaced 19 inches apart. Treatments were applied with a boom height of 18 inches and travel speed of 3.08 mph. The target application rate for each experiment was 10-20 gallons per acre (GPA).	
<u>Details of soil used</u> Geographic location Depth of soil collection Soil texture % sand % silt % clay pH: % organic carbon CEC (meq/100g) Moisture at 1/3 atm (%)	Greenville, Mississippi Not applicable Very fine sandy loam Not reported Not reported Not reported 7 Not reported Not reported Not reported	Organic matter: 1% Previous crop: cotton
Details of nutrient medium,	Not applicable	

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504

if used		
<u>Watering regime and schedules</u> Water source/type: Volume applied: Interval of application: Method of application:	None Not applicable Not applicable Not applicable	Rainfall during the yield study was not reported. The reviewer obtained partial rainfall data from MRID 51017501 (Table 12, pp. 137-138) where rainfall was collected from 6/22/19 to 7/19/19. According to this data, cumulative precipitation was 4.37 inches on 6/27/19 (vegetative stage application date) and 5.19 inches on 7/11/19 (reproductive stage application date). From 6/22/19 to 7/19/19, cumulative precipitation was 8.39 inches. See Reviewer's Comments for further details.
Any pest control method/fertilization, if used	<u>Pre-plant Herbicides</u> 5/27/2019 – Roundup® (32 fl oz/A) and Liberty® (32 fl oz/A) <u>Maintenance pesticides</u> 7/9/2019 – Dimetric® (8 fl oz/A) and Dual® (16 fl oz/A)	<u>Dessicant</u> 9/22/2019 – Gramoxone® (16 fl oz/A)
<u>Test conditions</u> Temperature (air): Temperature (soil at 2 in): Temperature (soil at 4 in): Photoperiod: Light intensity and quality: Relative humidity:	Vegetative growth stage: 83.0°F Reproductive stage: 87.4°F Vegetative growth stage: 91.0°F Reproductive stage: 90.0°F Vegetative growth stage: 89.0°F Reproductive stage: 86.0°F Not applicable; the study was conducted outside. Not measured Vegetative growth stage: 90% Reproductive stage: 72%	Only mean temperature and relative humidity data were reported. The reviewer was able to obtain partial ranges for temperature and relative humidity from MRID 51017501 (Tables 12-13, pp. 137-140) for dates ranging from 6/27/19 to 7/19/19. According to this data, ranges were the following:  Temperature (air): Vegetative growth stage: 66.6-97.0°F Reproductive stage: 71.1-93.9°F  Temperature (soil at 2 in): Vegetative growth stage: 73.6-105.7°F Reproductive stage: 75.3-99.9°F  Relative humidity: Vegetative growth stage: 45-98% Reproductive stage: 58-98%  See Reviewer's Comments for further details.  0% cloud cover for vegetative growth stage and 20% cloud cover for reproductive stage.

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504

<u>Reference chemical (if used)</u> Name: Concentrations:	N/A	
Other parameters, if any		
Other parameters, if any	None	

**2. Observations:**

**Table 5: Observation Parameters – Soybean Yield.**

Parameters	Vegetative Vigor	
	Details	Remarks
Parameters measured (e.g., number of germinated seeds, emerged seedlings, plant height, fresh weight or other endpoints)	Plant height Yield Visual Morphology	
Measurement technique for each parameter	Plant height was measured for 10 non-systematically selected plants from the 2 center rows in the treated areas of each plot. Plant height was measured from the soil surface to the tip of the newest emerging apical bud (leaf) of the main stem.  Morphology was visually determined as an aggregate across all plants within the center two treated rows of each plot.  Yield was calculated based on the actual weight of soybeans harvested from two rows (126.6 ft <sup>2</sup> ) and the measured moisture content of the harvested soybeans.	Plots were harvested using a combine. Harvest beans were weighed with a Harvest Master weighing system.
Observation intervals	Plant height and visual morphology were assessed for each treatment on the day of treatment (Day 0), or up to one day before treatment (Day -1), and at Days 14 and 28.	
Other observations, if any	N/A	

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

Were raw data included?	Yes	
Phytotoxicity rating system, if used	0-5 no effect; 10-30 slight effect; 40-60 moderate effect; 70-90 severe effect; 100- complete effect (dead plant)	

## II. RESULTS and DISCUSSION:

### A. INHIBITORY EFFECTS:

Survival during the study was not determined by the study author and therefore could not be analyzed by the reviewer.

When compared to the negative control, the reviewer found significant inhibitions in soybean plant height for both the vegetative growth and reproductive stages (Tables 6c and 6d). For both stages, significant inhibitions in soybean height were found at 0.00030 lb ae dicamba/A and 0.000675 lb ae glyphosate/A, the lowest test concentrations, and higher, compared to the negative control (Williams Multiple Comparison test,  $p < 0.05$ ).

The study author did not report inhibitions in height but did identify treatment levels with significant differences between treatment effects and the control, based on an overall F test ( $\alpha = 0.05$ ). The study author found significant effects at the same test concentrations as the reviewer, except the study author did not find the inhibitions at 0.00030 lb ae/A dicamba and 0.000675 lb ae/A glyphosate as significant.

**Table 6c: Percent Inhibition of Plant Height- Vegetative Growth Stage.**

Nominal Rate lb ae/A		Percent Inhibition <sup>1</sup>
Clarity® (a.i. Dicamba) <sup>2</sup>	Roundup PowerMax® (a.i. Glyphosate) <sup>3</sup>	Soybean
0.0003	0.000675	6*
0.0006	0.00135	9*
0.0012	0.0027	21*
0.0024	0.0054	29*
0.0048	0.0108	36*

<sup>1</sup> Treatment groups compared to the negative control.

<sup>2</sup> The measured, adjusted for field application rates were 0.00031, 0.00063, 0.0013, 0.0024, and 0.0049 lb ae/A.

<sup>3</sup> The measured, adjusted for field application rates were 0.00058, 0.0011, 0.0022, 0.0043, and 0.0092 lb ae/A.

<sup>4</sup> The study author did not consider percent inhibitions at these treatment levels as statistically significant

\* Statistically significant when compared to the negative control.

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

**Table 6d: Percent Inhibition of Plant Height- Reproductive Stage.**

Nominal Rate lb ae/A		Percent Inhibition <sup>1</sup>
Clarity® (a.i. Dicamba) <sup>2</sup>	Roundup PowerMax® (a.i. Glyphosate) <sup>3</sup>	Soybean
0.0003	0.000675	9*
0.0006	0.00135	10*
0.0012	0.0027	23*
0.0024	0.0054	32*
0.0048	0.0108	46*

<sup>1</sup> Treatment groups compared to the negative control.

<sup>2</sup> The measured, adjusted for field application rates were 0.00032, 0.00059, 0.0013, 0.0025, and 0.0050 lb ae/A.

<sup>3</sup> The measured, adjusted for field application rates were 0.00060, 0.0012, 0.0024, 0.0046, and 0.0099 lb ae/A.

\* Statistically significant when compared to the negative control.

When compared to the negative control, the reviewer found significant inhibitions in soybean yield for both the vegetative growth and reproductive stages (Tables 6e and 6f). For the vegetative growth stage, significant inhibitions in soybean yield were found at 0.00060 lb ae dicamba/A and 0.00135 lb ae glyphosate/A and higher, compared to the negative control (Williams Multiple Comparison test, p<0.05). For the reproductive stage, significant inhibitions in soybean yield were found at 0.0012 lb ae dicamba/A and 0.0027 lb ae glyphosate/A and higher, compared to the negative control (Williams Multiple Comparison test, p<0.05).

The study author did not report inhibitions in height but did identify treatment levels with significant differences between treatment effects and the control, based on an overall F test ( $\alpha = 0.05$ ). Based on the study author's results, the study author found significant inhibitions in soybean yield for both the vegetative growth and reproductive stage tests starting at 0.0024 lb ae dicamba/A and 0.0054 lb ae glyphosate/A and higher, while the reviewer found effects starting at 0.0060 and 0.0012 lb ae dicamba/A, respectively, for the vegetative growth and reproductive stage tests (0.00135 and 0.0027 lb ae glyphosate/A, respectively).

**Table 6e: Percent Inhibition of Plant Yield- Vegetative Growth Stage.**

Nominal Rate lb ae/A		Percent Inhibition <sup>1</sup>
Clarity® (a.i. Dicamba) <sup>2</sup>	Roundup PowerMax® (a.i. Glyphosate) <sup>3</sup>	Soybean
0.0003	0.000675	2
0.0006	0.00135	9*
0.0012	0.0027	4*
0.0024	0.0054	13*
0.0048	0.0108	13*

<sup>1</sup> Treatment groups compared to the negative control.

<sup>2</sup> The measured, adjusted for field application rates were 0.00031, 0.00063, 0.0013, 0.0024, and 0.0049 lb ae/A.

<sup>3</sup> The measured, adjusted for field application rates were 0.00058, 0.0011, 0.0022, 0.0043, and 0.0092 lb ae/A.

\* The study author did not consider percent inhibitions at these treatment levels as statistically significant.

\* Statistically significant when compared to the negative control.

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

**Table 6f: Percent Inhibition of Plant Yield- Reproductive Stage.**

Nominal Rate lb ae/A		Percent Inhibition <sup>1</sup>
Clarity® (a.i. Dicamba) <sup>2</sup>		Soybean
0.0003	0.000675	1
0.0006	0.00135	3
0.0012	0.0027	6 <sup>4*</sup>
0.0024	0.0054	9 <sup>*</sup>
0.0048	0.0108	21 <sup>*</sup>

<sup>1</sup> Treatment groups compared to the negative control.

<sup>2</sup> The measured, adjusted for field application rates were 0.00032, 0.00059, 0.0013, 0.0025, and 0.0050 lb ae/A.

<sup>3</sup> The measured, adjusted for field application rates were 0.00060, 0.0012, 0.0024, 0.0046, and 0.0099 lb ae/A.

<sup>4</sup> The study author did not consider percent inhibitions at this treatment level as statistically significant.

\* Statistically significant when compared to the negative control.

Dry weight during the study was not determined by the study author and therefore could not be analyzed by the reviewer.

The most sensitive dicot was soybean, based on height in the reproductive stage, with NOAEC and IC<sub>25</sub> values of <0.00032 and 0.00163 lb ae/A Dicamba, respectively (corresponding to a NOAEC and IC<sub>25</sub> of <0.0006 and 0.00309 lb ae/A glyphosate, respectively). Significant effects were observed at all application rates, and the IC<sub>05</sub>, IC<sub>25</sub>, IC<sub>50</sub>, and/or corresponding 95% confidence interval were outside of the range of tested concentrations; therefore, soybean results should be interpreted with caution.

The phytotoxic symptoms noted included leaf cupping, epinasty of both stems and petioles, and some stunting and were readily apparent at all application rates in soybean plants in the vegetative growth study. In the reproductive stage study, new growth leaves were cupped and some pods were curled in addition to compression of the main stem internodes. Phytotoxic symptoms were moderate and showed a dose-dependent response in both studies.

## B. REPORTED STATISTICS:

For each experiment, ANOVA was conducted separately for each variable and time-point according to a randomized complete block design using SAS®. Comparisons of each treatment to the water-only control were defined within the ANOVA and tested using Dunnett's test. A two-parameter logistic model was used to estimate an EC<sub>25</sub> and an EC<sub>50</sub> for plant height and yield if the overall F-test for a variable and time-point was significant ( $\alpha=0.05$ ).

**Table 7a: Effect of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt) on 28-Day Soybean Yield- Vegetative Growth Stage.**

Species	Results summary for height (lb ae/A Dicamba)									
	height (cm)	NOAEC	ER <sub>05</sub>	95% CI	ER <sub>25</sub>	95% CI	ER <sub>50</sub>	95% CI	slope	95%CI
Soybean	48.58-75.93	0.0003	ND	N/A	0.0021	ND	0.0093	ND	N/A	N/A

ND- Not determined. N/A- Not applicable.

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504

**Table 7b: Effect of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt) on 28-Day Soybean Yield - Reproductive Stage.**

Species	Results summary for height (lb ae/A Dicamba)									
	height (cm)	NOAEC	ER <sub>05</sub>	95% CI	ER <sub>25</sub>	95% CI	ER <sub>50</sub>	95% CI	slope	95% CI
Soybean	57.30-105.75	<0.0003	ND	N/A	0.0016	ND	0.0058	ND	N/A	N/A

ND- Not determined. N/A- Not applicable.

**Table 7c: Effect of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt) on 28-Day Soybean Yield - Vegetative Growth Stage.**

Species	Results summary for yield (lb ae/A Dicamba)									
	yield (kg/ha)	NOAEC	ER <sub>05</sub>	95% CI	ER <sub>25</sub>	95% CI	ER <sub>50</sub>	95% CI	slope	95% CI
Soybean	3924-4507	0.0012	ND	N/A	0.0211	ND	0.1957	ND	N/A	N/A

ND- Not determined. N/A- Not applicable.

**Table 7d: Effect of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt) on 28-Day Soybean Yield - Reproductive Growth Stage.**

Species	Results summary for yield (lb ae/A Dicamba)									
	yield (kg/ha)	NOAEC	EC <sub>05</sub>	95% CI	EC <sub>25</sub>	95% CI	EC <sub>50</sub>	95% CI	slope	95% CI
Soybean	3565-4489	0.0012	ND	N/A	0.0062	ND	0.0167	ND	N/A	N/A

ND- Not determined. N/A- Not applicable.

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504

**28-Day Mean Visual Injury Rating**

Nominal Rate lb ae/A		Vegetative Growth Stage (%)	Reproductive Stage (%)
Clarity® (a.i. Dicamba DGA) <sup>1</sup>	Roundup PowerMax® (a.i. Glyphosate acid) <sup>2</sup>		
0 (negative control)	0 (negative control)	0.00	0.00
0.00030	0.000675	15.00*	13.75*
0.00060	0.00135	18.75*	21.25*
0.0012	0.0027	30.00*	38.75*
0.0024	0.0054	38.75*	51.25*
0.0048	0.0108	50.00*	60.00*

<sup>1</sup> The measured, adjusted for field application rates were 0.00031, 0.00063, 0.0013, 0.0024, and 0.0049 lb ae dicamba/A and 0.00058, 0.0011, 0.0022, 0.0043, and 0.0092 lb ae glyphosate/A for the vegetative growth stage.

<sup>2</sup> The measured, adjusted for field application rates were 0.00032, 0.00059, 0.0013, 0.0025, and 0.0050 lb ae dicamba/A and 0.00060, 0.0012, 0.0024, 0.0046, and 0.0099 lb ae glyphosate/A for the reproductive stage.

\* Reported by the study author to be significantly greater than the control, according to the Nemenyi test.

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

**PMRA Submission Number {.....}**

**EPA MRID Number 51017504**

---

**C. VERIFICATION OF STATISTICAL RESULTS BY THE REVIEWER:**

All analyses were conducted comparing treated to the negative control. These analyses were conducted using CETIS version 1.9.5.3 with database backend settings implemented by EFED on 7/25/2017. Data for each endpoint were tested to determine if their distributions were normal and if their variances were homogeneous using Shapiro-Wilk's and Levene's tests, respectively. Data that satisfied these assumptions were subjected to Dunnett's and William's tests, and data that did not satisfy these assumptions were subjected to the non-parametric Mann-Whitney U and Jonckheere's tests. Linear (survival) and nonlinear (height and weight (yield)) regression models were used to interpret EC/IC<sub>x</sub> values. Measured concentrations, adjusted for field application rates, were used for all statistical analyses. The results of 28DAT Plant Height, Yield and %VSI are provided in the tables below. The complete statistics evaluation and 14DAT results are provided in the CETIS output pages at the back of this DER.

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504

**Vegetative Stage Exposure Results:**

**Table 8: Effect of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt) on 28-Day Soybean Plant Height- Vegetative Growth Stage.**

Species	Results summary for height (lb ae/A Dicamba)									
	height (cm)	NOAEC	IC <sub>05</sub>	95% CI	IC <sub>25</sub>	95% CI	IC <sub>50</sub>	95% CI	slope	95% CI
Soybean*	48.6-75.9	<0.00031	0.000219	0.000117-0.000336	0.00207	0.00179-0.00238	0.00988	0.00724-0.0135	N/A	N/A
Results summary for height (lb ae/A Glyphosate)										
Species	height (cm)	NOAEC	IC <sub>05</sub>	95% CI	IC <sub>25</sub>	95% CI	IC <sub>50</sub>	95% CI	slope	95% CI
	48.6-75.9	<0.00058	0.000357	0.00018-0.000567	0.00369	0.00316-0.00429	0.0187	0.0135-0.026	N/A	N/A

N/A- Not applicable.

\*Endpoints and/or confidence intervals are outside tested range of concentrations and should be interpreted with caution.

**Table 8b: Effect of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt) on 28-Day Soybean Yield- Vegetative Growth Stage.**

Species	Results summary for yield (lb ae/A Dicamba)									
	Yield (kb/ha)	NOAEC	IC <sub>05</sub>	95% CI	IC <sub>25</sub>	95% CI	IC <sub>50</sub>	95% CI	slope	95% CI
Soybean*	3920-4510	0.00031	0.000502	9.27E-05-0.00134	0.0263	0.00224-0.146	0.413	0.00231-73.7	N/A	N/A
Results summary for yield (lb ae/A Glyphosate)										
Species	yield (kg/ha)	NOAEC	IC <sub>05</sub>	95% CI	IC <sub>25</sub>	95% CI	IC <sub>50</sub>	95% CI	slope	95% CI
	3920-4510	0.00058	0.00087	0.000158-0.00237	0.0504	0.00429-0.283	0.848	0.00493-146	N/A	N/A

N/A- Not applicable.

\*Endpoints and/or confidence intervals are outside tested range of concentrations and should be interpreted with caution.

**Data Evaluation Record on the Toxicity of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504

**Reproductive Stage Exposure Results:**

**Table 9a: Effect of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt) on 28-Day Soybean Yield- Reproductive Stage.**

Species	Results summary for height (lb ae/A Dicamba)									
	height (cm)	NOAEC	IC <sub>05</sub>	95% CI	IC <sub>25</sub>	95% CI	IC <sub>50</sub>	95% CI	slope	95% CI
Soybean*	57.3-106	<0.00032	0.000236	0.00015-0.000327	0.00163	0.00145-0.00182	0.00626	0.00529-0.00741	N/A	N/A
Results summary for height (lb ae/A Glyphosate)										
	height (cm)	NOAEC	IC <sub>05</sub>	95% CI	IC <sub>25</sub>	95% CI	IC <sub>50</sub>	95% CI	slope	95% CI
	57.3-106	<0.00060	0.000432	0.000264-0.000612	0.00309	0.00273-0.00348	0.0121	0.0101-0.0145	N/A	N/A

N/A- Not applicable.

\*Endpoints and/or confidence intervals are outside tested range of concentrations and should be interpreted with caution.

**Table 9b: Effect of Clarity® (a.i. Dicamba DGA salt) + Roundup PowerMax® (a.i. Glyphosate potassium salt) on 28-Day Soybean Yield- Reproductive Stage.**

Species	yield (kg/ha)	NOAEC	IC <sub>05</sub>	95% CI	IC <sub>25</sub>	95% CI	IC <sub>50</sub>	95% CI	slope	95% CI
	Results summary for yield (lb ae/A Dicamba)									
Soybean*	3560-4490	0.00059	0.00136	0.000691-0.00202	0.00677	0.00455-0.00953	0.0207	0.00791-0.0543	N/A	N/A
Results summary for yield (lb ae/A Glyphosate)										
	3560-4490	0.0012	0.00238	0.00123-0.00357	0.0135	0.00898-0.0191	0.0449	0.0169-0.119	N/A	N/A

N/A- Not applicable.

\*Endpoints and/or confidence intervals are outside tested range of concentrations and should be interpreted with caution.

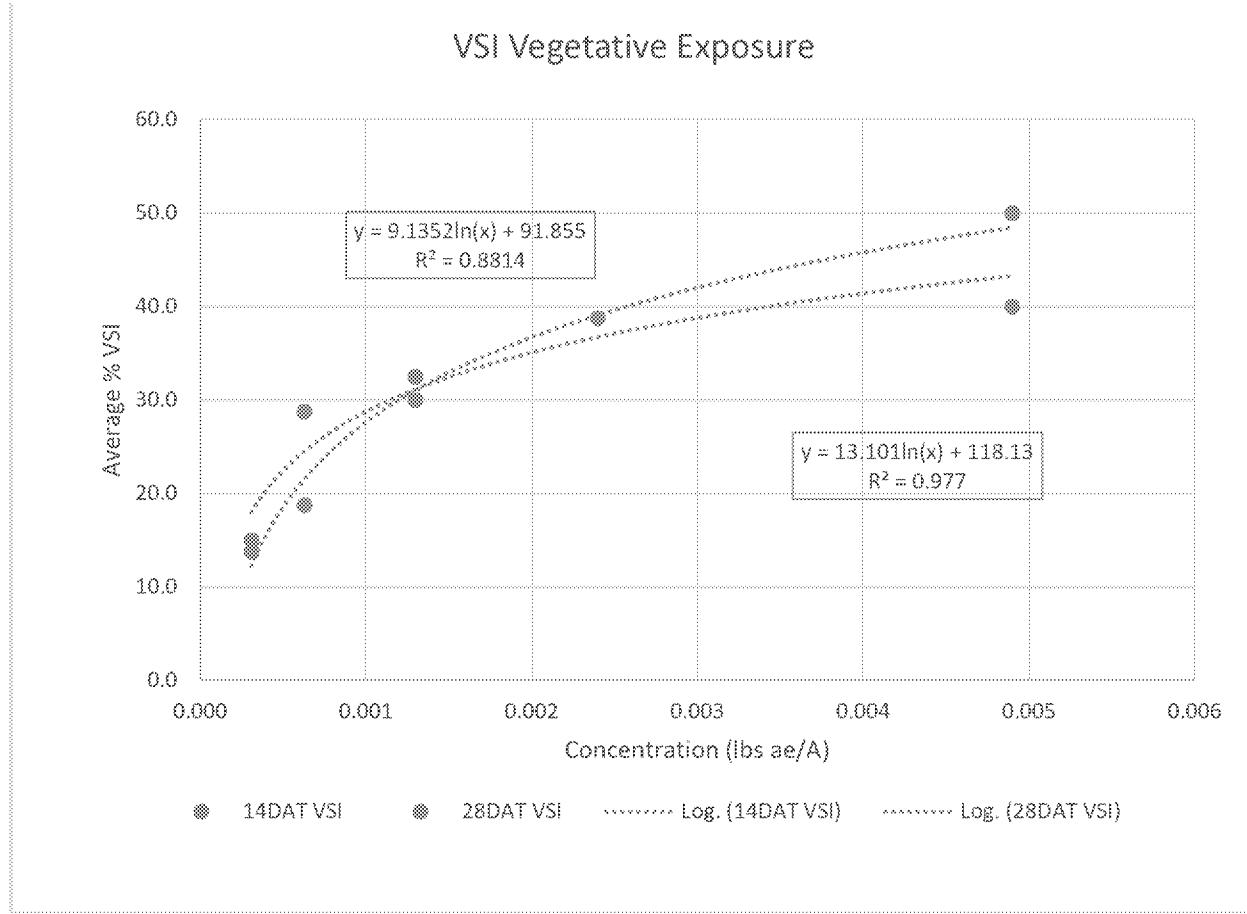
# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

## Evaluation of Visual Signs of Injury:

VSI was evaluated using logistic regression in Excel fit to observed VSI for each test dose. No hypothesis testing was evaluated to establish NOAEC/LOAEC endpoints. Regression equations provided in Figures 3 and 4 were used to estimate the %VSI for regression based IC<sub>x</sub> values for plant height and yield. See Table 1b in the executive summary for the results of these estimation procedures.

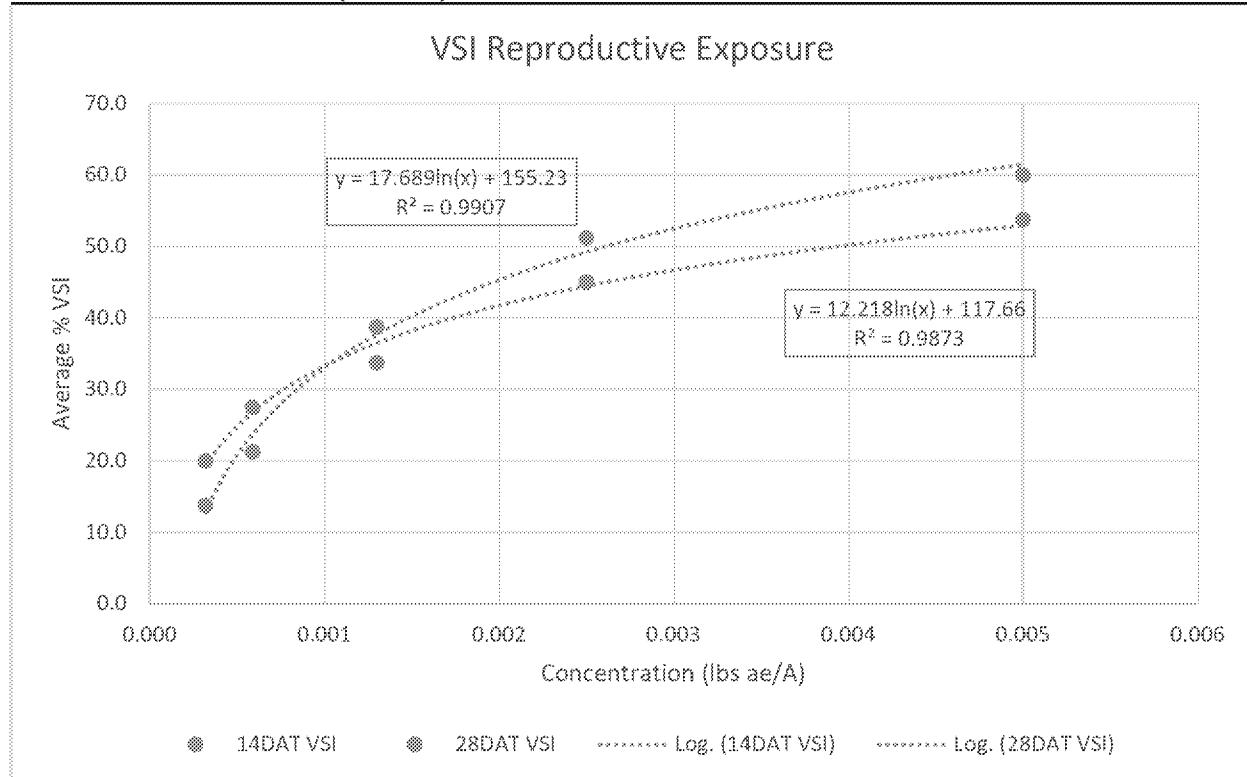


**Figure 3. Logistic regression of %VSI for 14DAT and 28DAT observations of %VSI after a vegetative growth stage exposure.**

**Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield**

PMRA Submission Number {.....}

EPA MRID Number 51017504



**Figure 4. Logistic regression of %VSI for 14DAT and 28DAT observations of %VSI after a reproductive growth stage exposure.**

**D. STUDY DEFICIENCIES:**

See discussion provided above

**E. REVIEWER'S COMMENTS:**

The reproductive stage with a NOAEC and EC<sub>25</sub> value for dicamba of <0.0003 and 0.0016 lb ae/A were the most sensitive measures of growth and reproduction overall (the study author did not report NOAEC values or endpoints in terms of glyphosate). Significant effects were observed at all application rates.

Differences between the study author and reviewer's results resulted from differences in statistical methods (hypothesis tests) and the study author analyzing nominal test concentrations while the reviewer analyzed measured test concentrations.

MRID 51017501 provided precipitation, temperature, and relative humidity data from 6/22/19 to 7/19/19 for the same location/site that also conducted the yield study. However, the yield study soybean crop was planted on 5/31/19 and application of test material occurred on 6/27/19 for the vegetative growth stage and 7/11/19 for the reproductive stage; the yield study was then conducted for 28 day from the time of application. Therefore, weather data was not reported for portions of the yield study.

Application dates for the vegetative growth and reproductive stages were June 27, 2019 and July 11, 2019, respectively.

# Data Evaluation Record on the Toxicity of Dicamba DGA salt and Glyphosate potassium salt to Terrestrial Vascular Plants: Soybean Yield

PMRA Submission Number {.....}

EPA MRID Number 51017504

## F. CONCLUSIONS:

See executive summary for reviewer's conclusions.

This study is scientifically sound and is classified as supplemental.

## III. REFERENCES:

- Ahrens, W.H. 1994. Dicamba. 3,6-dichloro-2-methoxybenzoic acid. Pages 91-94 in Herbicide Handbook. Seventh Edition. Weed Science Society of America, Champaign, Illinois.
- BASF Corporation. 2010. Clarity® herbicide label. BASF Corporation, Research Triangle Park, North Carolina.
- Behrens, R. and W.E. Lueschen. 1979. Dicamba volatility. Weed Science 27:486-493.
- Frans, R.E. and R.E. Talbert. 1977. Design of field experiments and the measurement and analysis of plant responses. Pages 15-23 in Research Methods in Weed Science. Weed Science Society of America, Lawrence, Kansas.
- Grossmann, K. 2010. Auxin herbicides: Current status of mechanism and mode of action. Pest Management Science 66:113-120.
- NPIC. 2012. Dicamba technical fact sheet. National Pesticide Information Center, Corvallis, Oregon.  
[http://npic.orst.edu/factsheets/dicamba\\_tech.html](http://npic.orst.edu/factsheets/dicamba_tech.html) [Accessed November 13, 2012].
- Porch, J. R., H.O. Kreugger, T.Z. Kendall, C. Holmes. 2009. BAS 183 09 H (Clarity): A Toxicity Test to Determine the Effects of the Test Substance on Seedling Emergence of Ten Species of Plants. BASF Study No: 358585.
- Weidenhamer, J.D., G.B. Triplett and F.E. Sobotka. 1989. Dicamba injury to soybean. Agronomy Journal 81:637-643.

## ATTACHMENT 1. OUTPUT OF REVIEWER'S STATISTICAL VERIFICATION



128931+  
51017504\_CETIS\_9-2

## ATTACHMENT 2. APPLICATION RATES, CONVERSIONS AND RAW DATA EXCEL FILE



MRID51017504\_STV  
-2019-0214\_Mississippi

**CETIS Summary Report**

 Report Date: 07 Apr-20 19:15 (p 1 of 2)  
 Test Code/ID: 51017504 direpr / 04-7600-2008

**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)**
**Stoneville R&D, Inc.**

Batch ID:	05-7449-5377	Test Type:	Vegetative Vigor Tier II	Analyst:	
Start Date:	11 Jul-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:	
Ending Date:		Species:	Glycine max	Brine:	
Test Length:	n/a	Taxon:		Source:	Age: R2
Sample ID:	18-9645-0520	Code:	51017504 direpr	Project:	
Sample Date:	11 Jul-19	Material:	Dicamba DGA	Source:	Monsanto Company
Receipt Date:		CAS (PC):		Station:	
Sample Age:	n/a	Client:	CDM Smith - K. Bozicevich		

128931 51017504; Soybean Yield; Reproductive Stage (R2)

**Multiple Comparison Summary**

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	TU	PMSD	S
20-5846-9389	Height	Dunnett Multiple Comparison Test	✓ <0.00032	0.00032	n/a		5.05%	1
16-8818-4398	Height	Williams Multiple Comparison Test	✓ <0.00032	0.00032	n/a		3.92%	1
02-5120-8286	Weight	Dunnett Multiple Comparison Test	0.0013	0.0025	0.001803		7.61%	1
04-3731-4932	Weight	Williams Multiple Comparison Test	0.00059	0.0013	0.0008758		5.9%	1

**Point Estimate Summary**

Analysis ID	Endpoint	Point Estimate Method	✓ Level	Ibs ae/A	95% LCL	95% UCL	TU	S
17-0420-7307	Height	NLR: 3P Cum Log-Normal (Probit)	✓ IC5	0.000236	0.00015	0.000327		1
			✓ IC10	0.000486	0.000381	0.0006		
			✓ IC25	0.00163	0.00145	0.00182		
			✓ IC50	0.00626	0.00529	0.00741		
07-1675-0700	Weight	NLR: 3P Cum Log-Normal (Probit)	IC5	0.00136	0.000691	0.00202		1
			IC10	0.00248	0.00179	0.00321		
			IC25	0.00677	0.00455	0.00953		
			IC50	0.0207	0.00791	0.0543		

**Height Summary**

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	106	101	110	102	109	1.43	2.86	2.70%	0.00%
0.00032		4	95.8	90.5	101	92.8	100	1.66	3.32	3.47%	9.41%
0.00059		4	95.7	92	99.4	93.6	98.1	1.16	2.31	2.42%	9.53%
0.0013		4	81.7	76.1	87.4	78.3	84.9	1.78	3.56	4.36%	22.72%
0.0025		4	71.6	65	78.2	68	76.1	2.08	4.15	5.80%	32.32%
0.005		4	57.3	53.9	60.7	54.9	59.9	1.07	2.15	3.75%	45.82%

**Weight Summary**

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	4490	4250	4730	4340	4690	74.3	149	3.31%	0.00%
0.00032		4	4450	4090	4800	4180	4650	113	225	5.06%	0.97%
0.00059		4	4340	4090	4590	4120	4460	78.4	157	3.61%	3.32%
0.0013		4	4220	3800	4630	3940	4520	130	260	6.17%	6.06%
0.0025		4	4070	3680	4470	3810	4400	123	246	6.04%	9.23%
0.005		4	3560	3360	3770	3410	3700	63.4	127	3.56%	20.59%

**CETIS Summary Report**Report Date: 07 Apr-20 19:15 (p 2 of 2)  
Test Code/ID: 51017504 direpr / 04-7600-2008**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)****Stoneville R&D, Inc.****Height Detail**

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	106	102	109	106
0.00032		92.8	100	95.9	94.1
0.00059		98.1	93.8	93.6	97.2
0.0013		79	78.3	84.7	84.9
0.0025		76.1	68.1	74.1	68
0.005		54.9	56.4	59.9	58

**Weight Detail**

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	4690	4470	4340	4460
0.00032		4650	4340	4610	4180
0.00059		4460	4120	4440	4350
0.0013		4520	4080	4340	3940
0.0025		4400	3810	4070	4020
0.005		3520	3700	3410	3630

# CETIS Summary Report

Report Date: 07 Apr-20 19:19 (p 1 of 2)  
 Test Code/ID: 51017504 diveg / 12-5859-2403

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

Batch ID:	04-6105-6410	Test Type:	Vegetative Vigor Tier II	Analyst:	
Start Date:	27 Jun-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:	
Ending Date:		Species:	Glycine max	Brine:	
Test Length:	n/a	Taxon:		Source:	Age: V4
Sample ID:	18-3409-4094	Code:	51017504 diveg	Project:	
Sample Date:	27 Jun-19	Material:	Dicamba DGA	Source:	Monsanto Company
Receipt Date:		CAS (PC):		Station:	
Sample Age:	n/a	Client:	CDM Smith - K. Bozicevich		

128931 51017504; Soybean yield; Vegetative Growth Stage (V4)

### Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	TU	PMSD	S
19-9498-7959	Height	Dunnett Multiple Comparison Test	✓ <0.00031	0.00031	n/a		5.69%	1
01-7550-4863	Height	Williams Multiple Comparison Test	✓ <0.00031	0.00031	n/a		4.41%	1
20-3524-2408	Weight	Dunnett Multiple Comparison Test	0.00031	0.00063	0.0004419		7.67%	1
14-0526-5354	Weight	Williams Multiple Comparison Test	0.00031	0.00063	0.0004419		5.95%	1

### Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	Ibs ae/A	95% LCL	95% UCL	TU	S
19-7387-1064	Height	NLR: 3P Cum Log-Normal (Probit)	✓ IC5	0.000219	0.000117	0.000336		1
			✓ IC10	0.000507	0.000366	0.000668		
			✓ IC25	0.00207	0.00179	0.00238		
			✓ IC50	0.00988	0.00724	0.0135		
15-0588-2720	Weight	NLR: 3P Cum Log-Normal (Probit)	IC5	0.000502	9.27E-05	0.00134		1
			IC10	0.00221	0.00115	0.0038		
			IC25	0.0263	0.00224	0.146		
			IC50	0.413	0.00231	73.7		

### Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	75.9	69.5	82.4	72.3	81.1	2.03	4.06	5.35%	0.00%
0.00031		4	71.6	67.3	75.9	68.7	74.4	1.34	2.69	3.76%	5.70%
0.00063		4	69.4	66.4	72.4	67.7	71.9	0.95	1.9	2.74%	8.56%
0.0013		4	60.3	55.6	64.9	56.9	63.7	1.47	2.94	4.89%	20.65%
0.0024		4	54.2	51.7	56.8	52.3	56.2	0.798	1.6	2.94%	28.55%
0.0049		4	48.6	48.2	48.9	48.4	48.9	0.111	0.222	0.46%	36.02%

### Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	4510	4130	4880	4200	4750	118	236	5.23%	0.00%
0.00031		4	4420	4280	4550	4320	4500	41.8	83.7	1.89%	2.00%
0.00063		4	4120	3820	4420	3890	4350	93.3	187	4.53%	8.60%
0.0013		4	4310	3990	4630	4030	4510	102	204	4.72%	4.38%
0.0024		4	3930	3460	4400	3510	4160	147	294	7.49%	12.76%
0.0049		4	3920	3690	4160	3800	4140	73.7	147	3.75%	12.92%

**CETIS Summary Report**

Report Date: 07 Apr-20 19:19 (p 2 of 2)  
Test Code/ID: 51017504 diveg / 12-5859-2403

**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)****Stoneville R&D, Inc.****Height Detail**

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	77.2	73.1	81.1	72.3
0.00031		70	68.7	74.4	73.3
0.00063		67.7	69.9	71.9	68.2
0.0013		59	61.4	63.7	56.9
0.0024		54.1	52.3	54.4	56.2
0.0049		48.5	48.4	48.5	48.9

**Weight Detail**

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	4470	4200	4600	4750
0.00031		4470	4500	4370	4320
0.00063		4110	3890	4350	4130
0.0013		4510	4310	4390	4030
0.0024		4120	4160	3510	3940
0.0049		3900	3860	4140	3800

# CETIS Analytical Report

Report Date: 07 Apr-20 19:14 (p 1 of 4)  
 Test Code/ID: 51017504 direpr / 04-7600-2008

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)				Stoneville R&D, Inc.				
Analysis ID:	20-5846-9389	Endpoint:	Height	CETIS Version:	CETISv1.9.5			
Analyzed:	07 Apr-20 19:13	Analysis:	Parametric-Control vs Treatments	Status Level:	1			
Batch ID:	05-7449-5377	Test Type:	Vegetative Vigor Tier II	Analyst:				
Start Date:	11 Jul-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:				
Ending Date:		Species:	Glycine max	Brine:				
Test Length:	n/a	Taxon:		Source:	Age: R2			
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			<0.00032	0.00032	n/a		5.05%

## Dunnett Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.00032*		4.48	2.41	5.34	6	CDF	6.6E-04	Significant Effect
	0.00059*		4.54	2.41	5.34	6	CDF	5.9E-04	Significant Effect
	0.0013*		10.8	2.41	5.34	6	CDF	2.7E-05	Significant Effect
	0.0025*		15.4	2.41	5.34	6	CDF	2.7E-05	Significant Effect
	0.005*		21.8	2.41	5.34	6	CDF	2.7E-05	Significant Effect

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.66	2.8	1.0000	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	6474.46	1294.89	5	132	<1.0E-37	Significant Effect
Error	177.232	9.84625	18			
Total	6651.7		23			

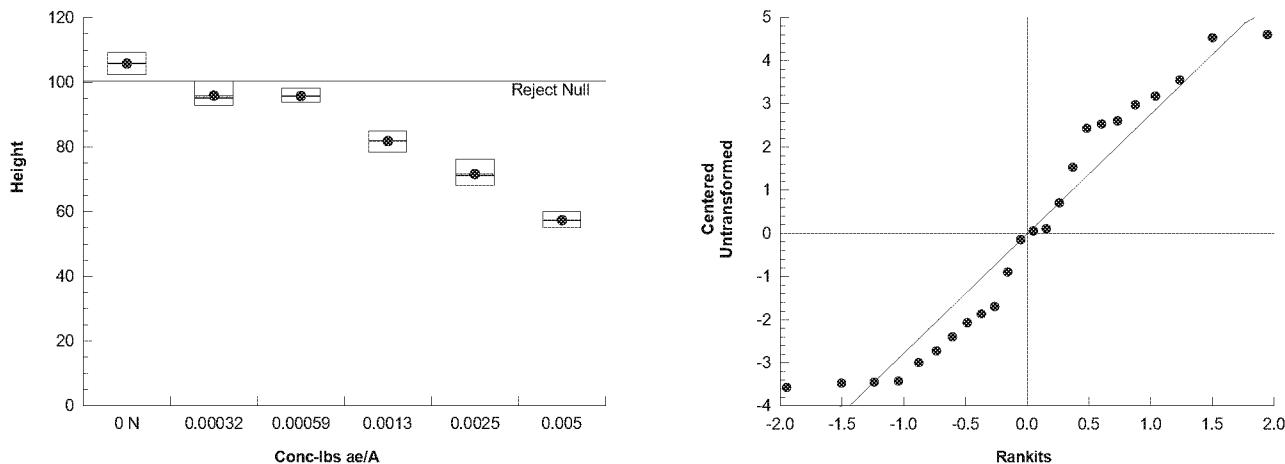
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	1.67	15.1	0.8922	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.884	0.0443	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	106	101	110	106	102	109	1.43	2.70%	0.00%
0.00032		4	95.8	90.5	101	95	92.8	100	1.66	3.47%	9.41%
0.00059		4	95.7	92	99.4	95.5	93.6	98.1	1.16	2.42%	9.53%
0.0013		4	81.7	76.1	87.4	81.8	78.3	84.9	1.78	4.36%	22.72%
0.0025		4	71.6	65	78.2	71.1	68	76.1	2.08	5.80%	32.32%
0.005		4	57.3	53.9	60.7	57.2	54.9	59.9	1.07	3.75%	45.82%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:14 (p 2 of 4)  
 Test Code/ID: 51017504 direpr / 04-7600-2008

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID: 16-8818-4398 Analyzed: 07 Apr-20 19:13		Endpoint: Height Analysis: Parametric-Control vs Ord.Treatments			CETIS Version: CETISv1.9.5	Status Level: 1
Batch ID: 05-7449-5377	Start Date: 11 Jul-19	Test Type: Vegetative Vigor Tier II Protocol: OCSPP 850.4150 Plant Vegetative Vigor			Analyst:	
Ending Date:		Species: Glycine max			Diluent:	
Test Length: n/a		Taxon:			Brine:	
					Source:	Age: R2
Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	<0.00032	0.00032	n/a		3.92%

## Williams Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha$ :5%)
Negative Control	0.00032*	4.48	1.73	3.85	6	CDF	<0.05	Significant Effect	
	0.00059*	4.54	1.82	4.03	6	CDF	<0.05	Significant Effect	
	0.0013*	10.8	1.85	4.09	6	CDF	<0.05	Significant Effect	
	0.0025*	15.4	1.86	4.12	6	CDF	<0.05	Significant Effect	
	0.005*	21.8	1.87	4.14	6	CDF	<0.05	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :5%)
Outlier	Grubbs Extreme Value Test	1.66	2.8	1.0000	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)
Between	6474.46	1294.89	5	132	<1.0E-37	Significant Effect
Error	177.232	9.84625	18			
Total	6651.7		23			

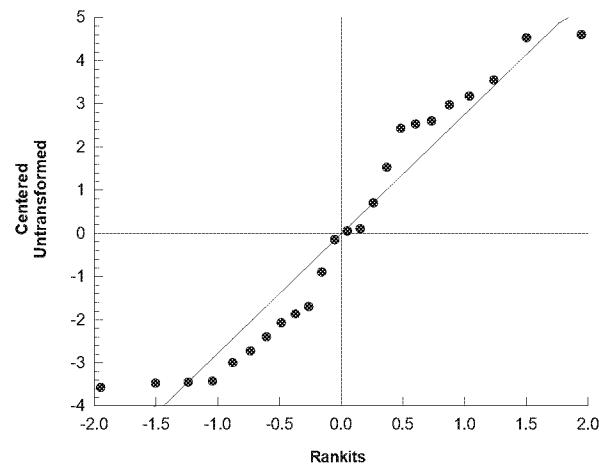
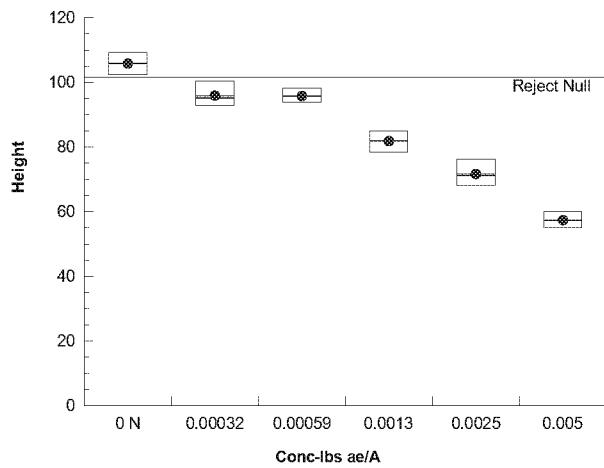
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)
Variance	Bartlett Equality of Variance Test	1.67	15.1	0.8922	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.884	0.0443	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	106	101	110	106	102	109	1.43	2.70%	0.00%
0.00032		4	95.8	90.5	101	95	92.8	100	1.66	3.47%	9.41%
0.00059		4	95.7	92	99.4	95.5	93.6	98.1	1.16	2.42%	9.53%
0.0013		4	81.7	76.1	87.4	81.8	78.3	84.9	1.78	4.36%	22.72%
0.0025		4	71.6	65	78.2	71.1	68	76.1	2.08	5.80%	32.32%
0.005		4	57.3	53.9	60.7	57.2	54.9	59.9	1.07	3.75%	45.82%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:14 (p 3 of 4)  
 Test Code/ID: 51017504 direpr / 04-7600-2008

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.			
Analysis ID:	02-5120-8286	Endpoint:	Weight	CETIS Version:	CETISv1.9.5			
Analyzed:	07 Apr-20 19:13	Analysis:	Parametric-Control vs Treatments	Status Level:	1			
Batch ID:	05-7449-5377	Test Type:	Vegetative Vigor Tier II	Analyst:				
Start Date:	11 Jul-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:				
Ending Date:		Species:	Glycine max	Brine:				
Test Length:	n/a	Taxon:		Source:	Age: R2			
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			0.0013	0.0025	0.001803		7.61%

## Dunnett Multiple Comparison Test

Control	vs	Conc-lbs ae/	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.00032	0.306	2.41	342	6	CDF	0.7277	Non-Significant Effect	
	0.00059	1.05	2.41	342	6	CDF	0.4001	Non-Significant Effect	
	0.0013	1.92	2.41	342	6	CDF	0.1200	Non-Significant Effect	
	0.0025*	2.92	2.41	342	6	CDF	0.0182	Significant Effect	
	0.005*	6.51	2.41	342	6	CDF	3.5E-05	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.86	2.8	1.0000	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	2328470	465694	5	11.6	4.1E-05	Significant Effect
Error	725251	40291.7	18			
Total	3053720		23			

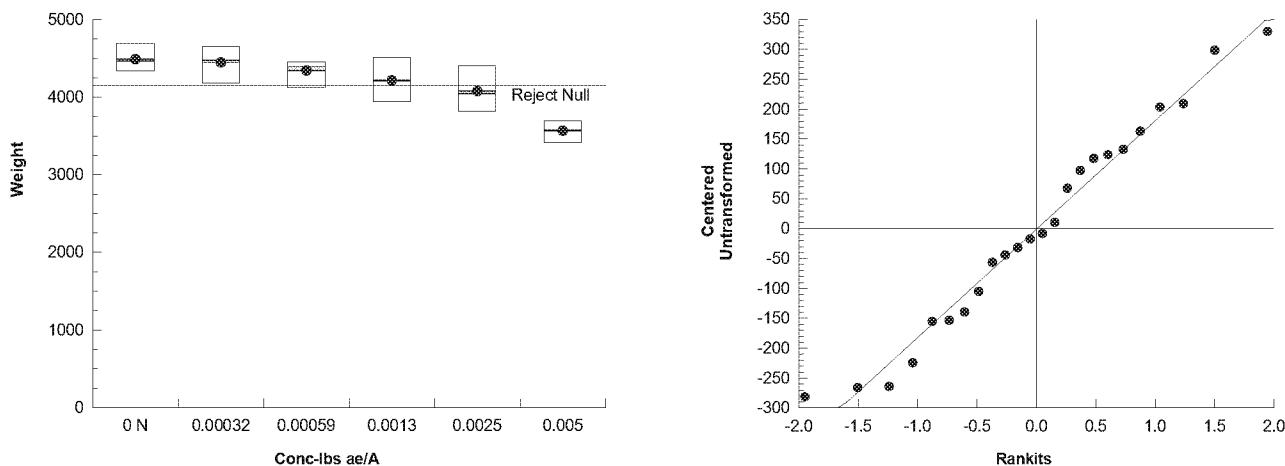
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	2.27	15.1	0.8103	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.884	0.5996	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	4490	4250	4730	4460	4340	4690	74.3	3.31%	0.00%
0.00032		4	4450	4090	4800	4470	4180	4650	113	5.06%	0.97%
0.00059		4	4340	4090	4590	4390	4120	4460	78.4	3.61%	3.32%
0.0013		4	4220	3800	4630	4210	3940	4520	130	6.17%	6.06%
0.0025		4	4070	3680	4470	4040	3810	4400	123	6.04%	9.23%
0.005		4	3560	3360	3770	3580	3410	3700	63.4	3.56%	20.59%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:14 (p 4 of 4)  
 Test Code/ID: 51017504 direpr / 04-7600-2008

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.			
Analysis ID:	04-3731-4932	Endpoint:	Weight	CETIS Version:	CETISv1.9.5			
Analyzed:	07 Apr-20 19:13	Analysis:	Parametric-Control vs Ord.Treatments	Status Level:	1			
Batch ID:	05-7449-5377	Test Type:	Vegetative Vigor Tier II	Analyst:				
Start Date:	11 Jul-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:				
Ending Date:		Species:	Glycine max	Brine:				
Test Length:	n/a	Taxon:		Source:	Age: R2			
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			0.00059	0.0013	0.0008758		5.90%

## Williams Multiple Comparison Test

Control	vs	Conc-lbs ae/A	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.00032	0.306	1.73	246	6	CDF	>0.05	Non-Significant Effect	
	0.00059	1.05	1.82	258	6	CDF	>0.05	Non-Significant Effect	
	0.0013*	1.92	1.85	262	6	CDF	<0.05	Significant Effect	
	0.0025*	2.92	1.86	264	6	CDF	<0.05	Significant Effect	
	0.005*	6.51	1.87	265	6	CDF	<0.05	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.86	2.8	1.0000	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	2328470	465694	5	11.6	4.1E-05	Significant Effect
Error	725251	40291.7	18			
Total	3053720		23			

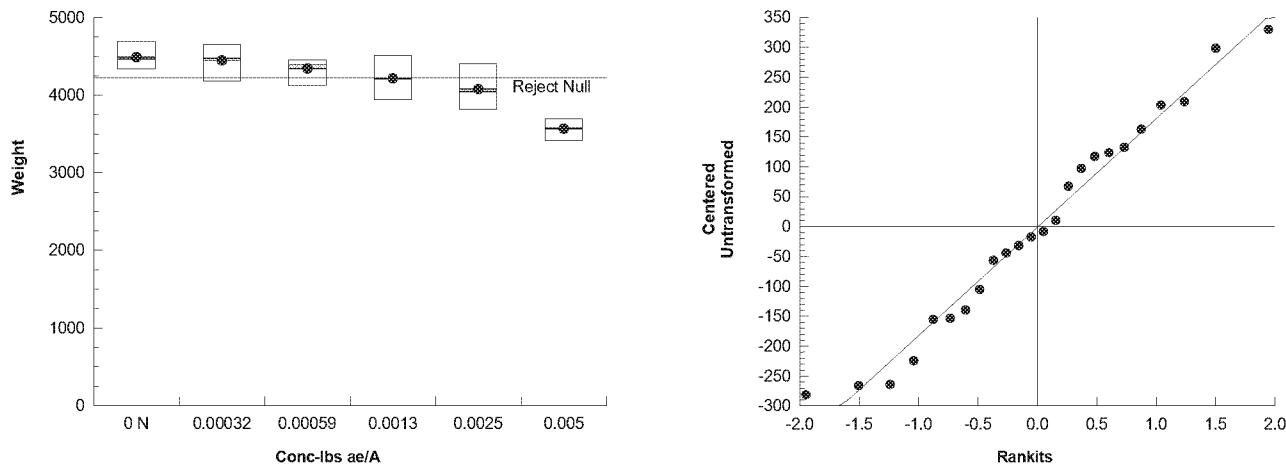
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	2.27	15.1	0.8103	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.884	0.5996	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	4490	4250	4730	4460	4340	4690	74.3	3.31%	0.00%
0.00032		4	4450	4090	4800	4470	4180	4650	113	5.06%	0.97%
0.00059		4	4340	4090	4590	4390	4120	4460	78.4	3.61%	3.32%
0.0013		4	4220	3800	4630	4210	3940	4520	130	6.17%	6.06%
0.0025		4	4070	3680	4470	4040	3810	4400	123	6.04%	9.23%
0.005		4	3560	3360	3770	3580	3410	3700	63.4	3.56%	20.59%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:14 (p 1 of 4)  
 Test Code/ID: 51017504 direpr / 04-7600-2008

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

Analysis ID:	17-0420-7307	Endpoint:	Height	CETIS Version:	CETISv1.9.5
Analyzed:	07 Apr-20 19:13	Analysis:	Nonlinear Regression (NLR)	Status Level:	1
Batch ID:	05-7449-5377	Test Type:	Vegetative Vigor Tier II	Analyst:	
Start Date:	11 Jul-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:	
Ending Date:		Species:	Glycine max	Brine:	
Test Length:	n/a	Taxon:		Source:	Age: R2

### Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha [1 - \Phi[\log[x/\delta]/\gamma]]$	Normal [ $\omega=1$ ]	Off [ $\mu^*=\mu$ ]	None	None

### Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSE	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
4	-27.9	63	65.3	0.9613	3.16%	105	Yes	1.96	0.1557	Non-Significant Lack of Fit

### Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.000236	0.00015	0.000327
IC10	0.000486	0.000381	0.0006
IC25	0.00163	0.00145	0.00182
IC50	0.00626	0.00529	0.00741

### Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	105	1.6	102	109	65.9	<1.0E-37	Significant Parameter
$\gamma$	1.99	0.156	1.67	2.32	12.8	<1.0E-37	Significant Parameter
$\delta$	0.00626	0.000513	0.0052	0.00733	12.2	<1.0E-37	Significant Parameter

### ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	178000	59400	3	5310	<1.0E-37	Significant
Lack of Fit	58	19.3	3	1.96	0.1557	Non-Significant
Pure Error	177	9.85	18			
Residual	235	11.2	21			

### Residual Analysis

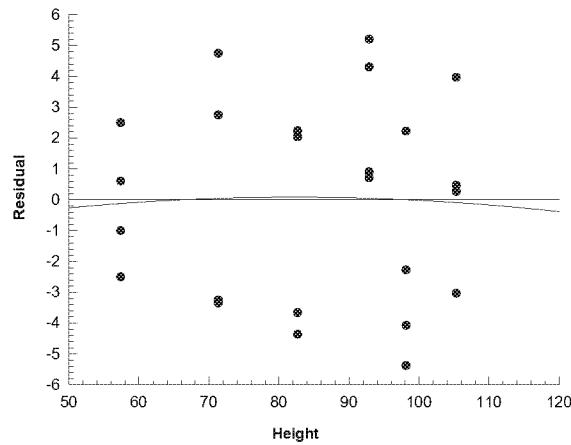
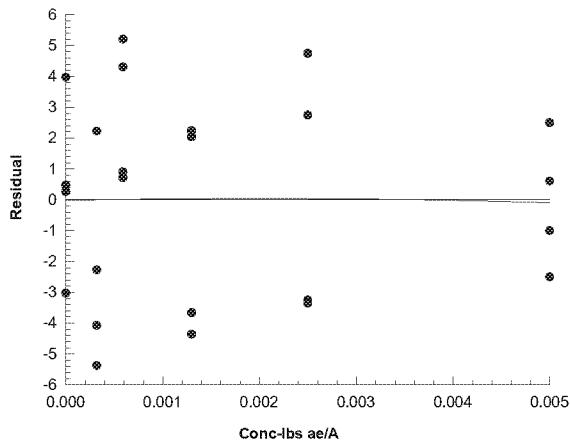
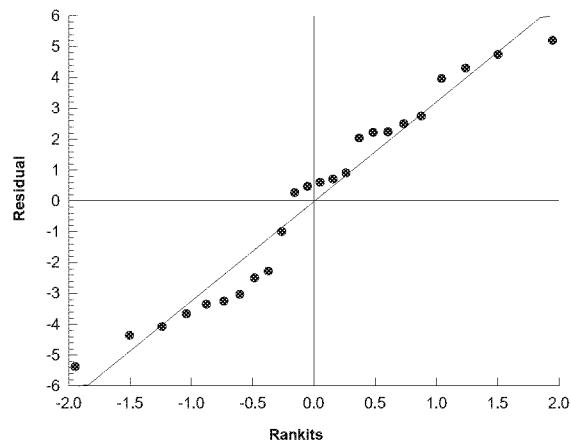
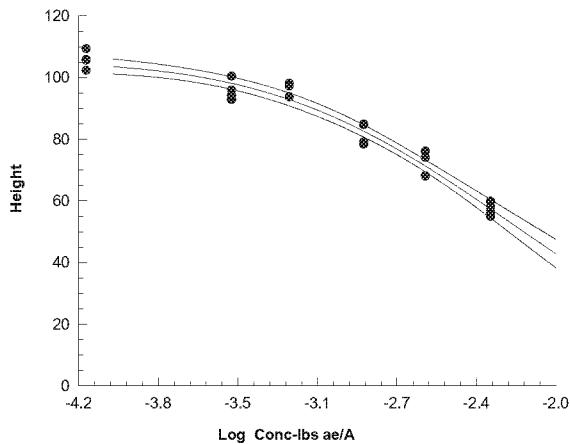
Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.68	2.8	1.0000	No Outliers Detected
Variance	Bartlett Equality of Variance Test	1.67	11.1	0.8922	Equal Variances
	Mod Levene Equality of Variance	1.28	2.77	0.3164	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.547	2.49	0.1630	Normal Distribution
	Shapiro-Wilk W Normality Test	0.945	0.917	0.2069	Normal Distribution

### Height Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	106	102	109	1.43	2.86	2.70%	0.0%
0.00032		4	95.8	92.8	100	1.66	3.32	3.47%	9.41%
0.00059		4	95.7	93.6	98.1	1.16	2.31	2.42%	9.53%
0.0013		4	81.7	78.3	84.9	1.78	3.56	4.36%	22.7%
0.0025		4	71.6	68	76.1	2.08	4.15	5.80%	32.3%
0.005		4	57.3	54.9	59.9	1.07	2.15	3.75%	45.8%

**CETIS Analytical Report**Report Date: 07 Apr-20 19:14 (p 2 of 4)  
Test Code/ID: 51017504 direpr / 04-7600-2008**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)**

Stoneville R&amp;D, Inc.

Analysis ID: 17-0420-7307  
Analyzed: 07 Apr-20 19:13Endpoint: Height  
Analysis: Nonlinear Regression (NLR)CETIS Version: CETISv1.9.5  
Status Level: 1**Graphics**Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]

# CETIS Analytical Report

Report Date: 07 Apr-20 19:14 (p 3 of 4)  
 Test Code/ID: 51017504 direpr / 04-7600-2008

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)				Stoneville R&D, Inc.	
Analysis ID: 07-1675-0700	Endpoint: Weight			CETIS Version: CETISv1.9.5	
Analyzed: 07 Apr-20 19:13	Analysis: Nonlinear Regression (NLR)			Status Level: 1	
Batch ID: 05-7449-5377	Test Type: Vegetative Vigor Tier II			Analyst:	
Start Date: 11 Jul-19	Protocol: OCSPP 850.4150 Plant Vegetative Vigor			Diluent:	
Ending Date:	Species: Glycine max			Brine:	
Test Length: n/a	Taxon:			Source:	Age: R2

## Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha [1 - \Phi[\log(x/\delta)/\gamma]]$	Normal [ $\omega=1$ ]	Off [ $\mu^*=\mu$ ]	None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSE	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
10	-125	257	259	0.7267	3.42%	4460	Yes	0.304	0.8224	Non-Significant Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.00136	0.000691	0.00202
IC10	0.00248	0.00179	0.00321
IC25	0.00677	0.00455	0.00953
IC50	0.0207	0.00791	0.0543

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	4460	73.4	4310	4610	60.8	<1.0E-37	Significant Parameter
$\gamma$	1.66	0.453	0.715	2.6	3.66	0.0015	Significant Parameter
$\delta$	0.0207	0.00874	0.00255	0.0389	2.37	0.0273	Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	423000000	141000000	3	3890	<1.0E-37	Significant
Lack of Fit	36700	12200	3	0.304	0.8224	Non-Significant
Pure Error	725000	40300	18			
Residual	762000	36300	21			

## Residual Analysis

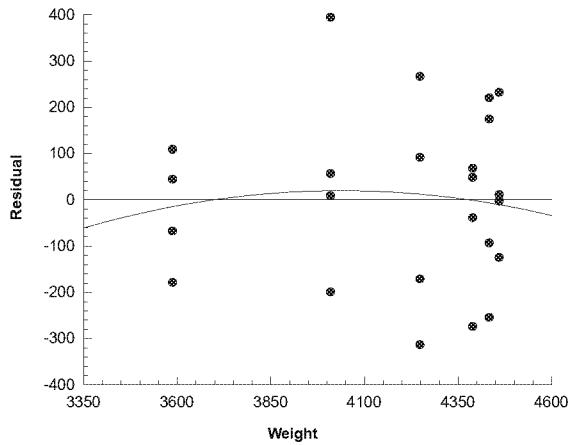
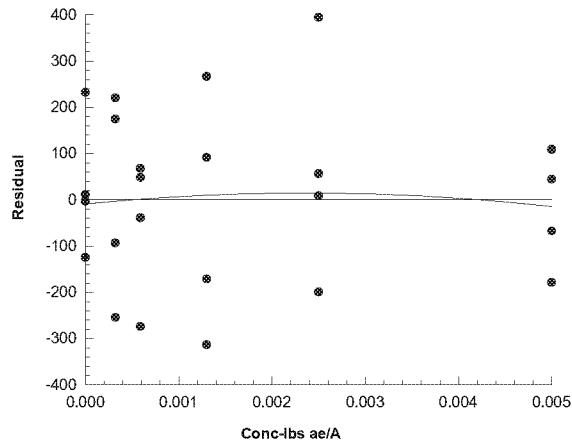
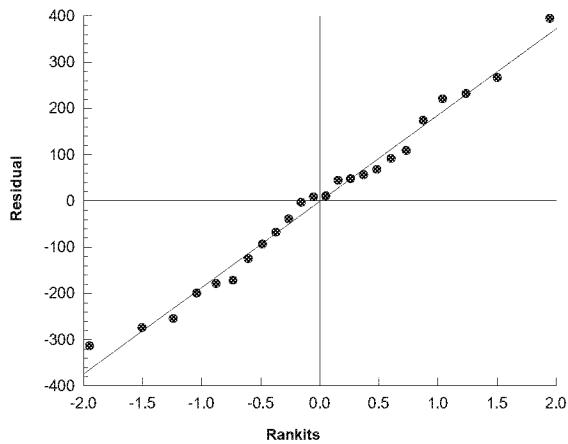
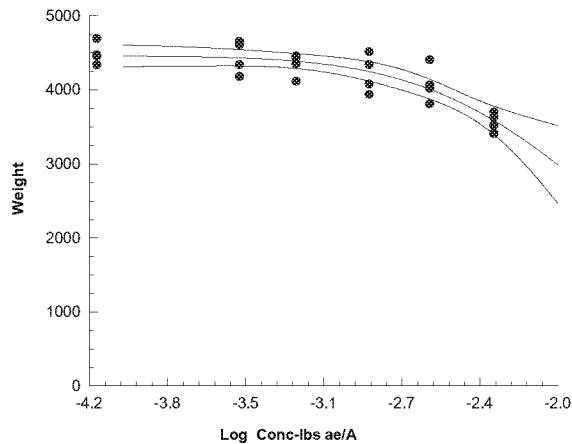
Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.17	2.8	0.5576	No Outliers Detected
Variance	Bartlett Equality of Variance Test	2.27	11.1	0.8103	Equal Variances
	Mod Levene Equality of Variance	0.855	2.77	0.5295	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.176	2.49	0.9792	Normal Distribution
	Shapiro-Wilk W Normality Test	0.982	0.917	0.9341	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	4490	4340	4690	74.3	149	3.31%	0.0%
0.00032		4	4450	4180	4650	113	225	5.06%	0.97%
0.00059		4	4340	4120	4460	78.4	157	3.61%	3.32%
0.0013		4	4220	3940	4520	130	260	6.17%	6.06%
0.0025		4	4070	3810	4400	123	246	6.04%	9.23%
0.005		4	3560	3410	3700	63.4	127	3.56%	20.6%

**CETIS Analytical Report**Report Date: 07 Apr-20 19:14 (p 4 of 4)  
Test Code/ID: 51017504 direpr / 04-7600-2008**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)**

Stoneville R&amp;D, Inc.

Analysis ID: 07-1675-0700  
Analyzed: 07 Apr-20 19:13Endpoint: Weight  
Analysis: Nonlinear Regression (NLR)CETIS Version: CETISv1.9.5  
Status Level: 1**Graphics**Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]

# CETIS Analytical Report

Report Date: 07 Apr-20 19:18 (p 1 of 4)  
 Test Code/ID: 51017504 diveg / 12-5859-2403

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)				Stoneville R&D, Inc.		
Analysis ID:	19-9498-7959	Endpoint:	Height	CETIS Version:	CETISv1.9.5	
Analyzed:	07 Apr-20 19:16	Analysis:	Parametric-Control vs Treatments	Status Level:	1	
Batch ID:	04-6105-6410	Test Type:	Vegetative Vigor Tier II	Analyst:		
Start Date:	27 Jun-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:		
Ending Date:		Species:	Glycine max	Brine:		
Test Length:	n/a	Taxon:		Source:	Age: V4	
Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	<0.00031	0.00031	n/a		5.69%

## Dunnett Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha$ :5%)
Negative Control	0.00031*		2.41	2.41	4.32	6	CDF	0.0496	Significant Effect
	0.00063*		3.62	2.41	4.32	6	CDF	0.0041	Significant Effect
	0.0013*		8.74	2.41	4.32	6	CDF	2.7E-05	Significant Effect
	0.0024*		12.1	2.41	4.32	6	CDF	2.7E-05	Significant Effect
	0.0049*		15.2	2.41	4.32	6	CDF	2.7E-05	Significant Effect

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :5%)
Outlier	Grubbs Extreme Value Test	2.31	2.8	0.3554	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)
Between	2295.27	459.055	5	71.3	<1.0E-37	Significant Effect
Error	115.863	6.43681	18			
Total	2411.14		23			

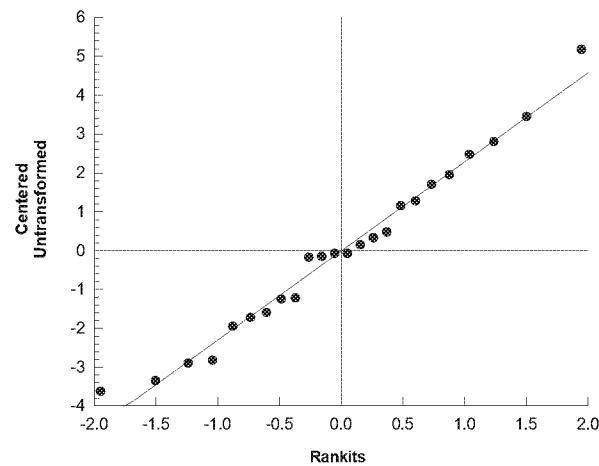
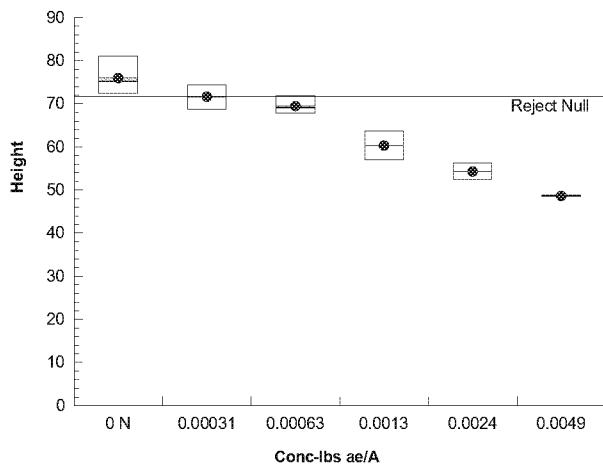
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)
Variance	Bartlett Equality of Variance Test	13.3	15.1	0.0204	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.884	0.8441	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	75.9	69.5	82.4	75.1	72.3	81.1	2.03	5.35%	0.00%
0.00031		4	71.6	67.3	75.9	71.7	68.7	74.4	1.34	3.76%	5.70%
0.00063		4	69.4	66.4	72.4	69.1	67.7	71.9	0.95	2.74%	8.56%
0.0013		4	60.3	55.6	64.9	60.2	56.9	63.7	1.47	4.89%	20.65%
0.0024		4	54.2	51.7	56.8	54.2	52.3	56.2	0.798	2.94%	28.55%
0.0049		4	48.6	48.2	48.9	48.5	48.4	48.9	0.111	0.46%	36.02%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:18 (p 2 of 4)  
 Test Code/ID: 51017504 diveg / 12-5859-2403

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.			
Analysis ID:	01-7550-4863	Endpoint:	Height	CETIS Version:	CETISv1.9.5			
Analyzed:	07 Apr-20 19:16	Analysis:	Parametric-Control vs Ord.Treatments	Status Level:	1			
Batch ID:	04-6105-6410	Test Type:	Vegetative Vigor Tier II	Analyst:				
Start Date:	27 Jun-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:				
Ending Date:		Species:	Glycine max	Brine:				
Test Length:	n/a	Taxon:		Source:	Age: V4			
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			<0.00031	0.00031	n/a		4.41%

## Williams Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.00031*		2.41	1.73	3.11	6	CDF	<0.05	Significant Effect
	0.00063*		3.62	1.82	3.26	6	CDF	<0.05	Significant Effect
	0.0013*		8.74	1.85	3.31	6	CDF	<0.05	Significant Effect
	0.0024*		12.1	1.86	3.34	6	CDF	<0.05	Significant Effect
	0.0049*		15.2	1.87	3.35	6	CDF	<0.05	Significant Effect

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.31	2.8	0.3554	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	2295.27	459.055	5	71.3	<1.0E-37	Significant Effect
Error	115.863	6.43681	18			
Total	2411.14		23			

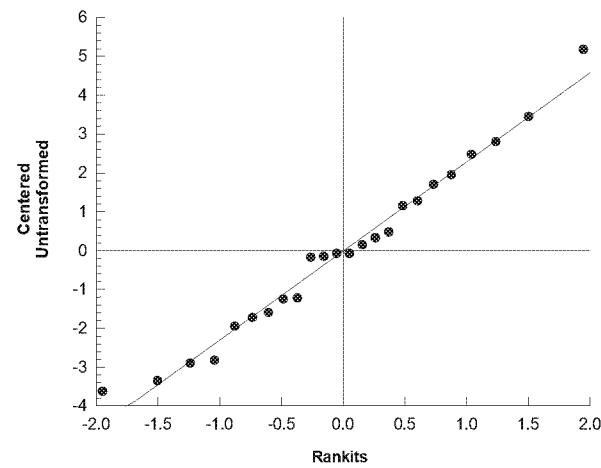
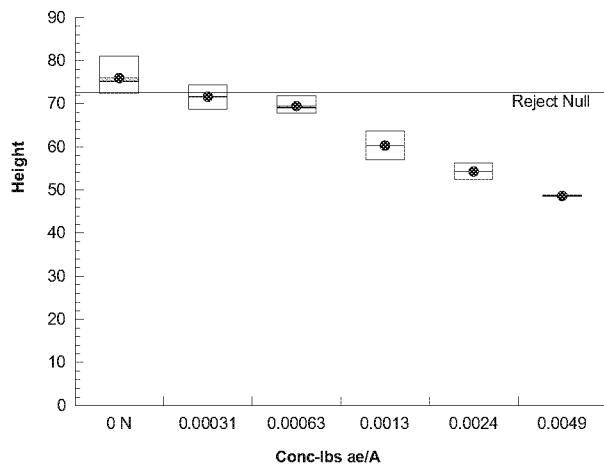
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	13.3	15.1	0.0204	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.884	0.8441	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	75.9	69.5	82.4	75.1	72.3	81.1	2.03	5.35%	0.00%
0.00031		4	71.6	67.3	75.9	71.7	68.7	74.4	1.34	3.76%	5.70%
0.00063		4	69.4	66.4	72.4	69.1	67.7	71.9	0.95	2.74%	8.56%
0.0013		4	60.3	55.6	64.9	60.2	56.9	63.7	1.47	4.89%	20.65%
0.0024		4	54.2	51.7	56.8	54.2	52.3	56.2	0.798	2.94%	28.55%
0.0049		4	48.6	48.2	48.9	48.5	48.4	48.9	0.111	0.46%	36.02%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:18 (p 3 of 4)  
 Test Code/ID: 51017504 diveg / 12-5859-2403

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.				
Analysis ID: 20-3524-2408 Analyzed: 07 Apr-20 19:16		Endpoint: Weight Analysis: Parametric-Control vs Treatments			CETIS Version: CETISv1.9.5	Status Level: 1			
Batch ID: 04-6105-6410	Start Date: 27 Jun-19	Test Type: Vegetative Vigor Tier II Protocol: OCSPP 850.4150 Plant Vegetative Vigor			Analyst:				
Ending Date:		Species: Glycine max			Diluent:				
Test Length: n/a		Taxon:			Brine:				
					Source:	Age: V4			
Data Transform	Alt Hyp				NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T				0.00031	0.00063	0.0004419		7.67%

## Dunnett Multiple Comparison Test

Control	vs	Conc-lbs ae/A	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.00031	0.629	2.41	345	6	CDF	0.5904	Non-Significant Effect	
	0.00063*	2.7	2.41	345	6	CDF	0.0283	Significant Effect	
	0.0013	1.38	2.41	345	6	CDF	0.2700	Non-Significant Effect	
	0.0024*	4.01	2.41	345	6	CDF	0.0018	Significant Effect	
	0.0049*	4.06	2.41	345	6	CDF	0.0016	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.33	2.8	0.3329	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	1229630	245925	5	5.97	0.0020	Significant Effect
Error	741595	41199.7	18			
Total	1971220		23			

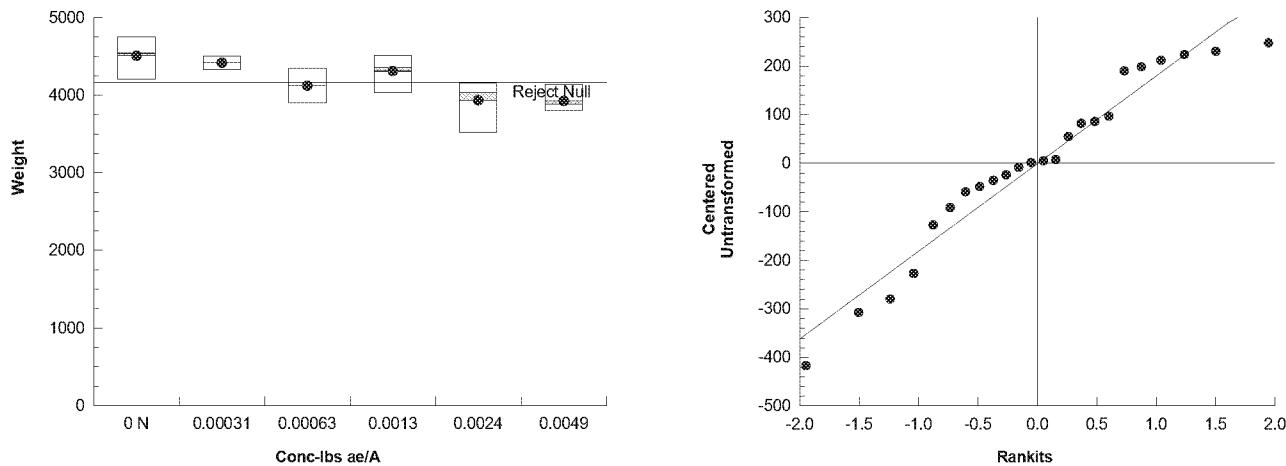
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	4.07	15.1	0.5393	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.884	0.1842	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	4510	4130	4880	4540	4200	4750	118	5.23%	0.00%
0.00031		4	4420	4280	4550	4420	4320	4500	41.8	1.89%	2.00%
0.00063		4	4120	3820	4420	4120	3890	4350	93.3	4.53%	8.60%
0.0013		4	4310	3990	4630	4350	4030	4510	102	4.72%	4.38%
0.0024		4	3930	3460	4400	4030	3510	4160	147	7.49%	12.76%
0.0049		4	3920	3690	4160	3880	3800	4140	73.7	3.75%	12.92%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:18 (p 4 of 4)  
 Test Code/ID: 51017504 diveg / 12-5859-2403

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID: 14-0526-5354 Analyzed: 07 Apr-20 19:16		Endpoint: Weight Analysis: Parametric-Control vs Ord.Treatments			CETIS Version: CETISv1.9.5 Status Level: 1	
Batch ID: 04-6105-6410 Start Date: 27 Jun-19 Ending Date: Test Length: n/a	Test Type: Vegetative Vigor Tier II Protocol: OCSPP 850.4150 Plant Vegetative Vigor Species: Glycine max Taxon:			Analyst: Diluent: Brine: Source:		
					Age: V4	
Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	0.00031	0.00063	0.0004419		5.95%

## Williams Multiple Comparison Test

Control	vs	Conc-lbs ae/A	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control		0.00031	0.629	1.73	249	6	CDF	>0.05	Non-Significant Effect
		0.00063*	2.7	1.82	261	6	CDF	<0.05	Significant Effect
		0.0013*	2.04	1.85	265	6	CDF	<0.05	Significant Effect
		0.0024*	4.01	1.86	267	6	CDF	<0.05	Significant Effect
		0.0049*	4.06	1.87	268	6	CDF	<0.05	Significant Effect

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.33	2.8	0.3329	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	1229630	245925	5	5.97	0.0020	Significant Effect
Error	741595	41199.7	18			
Total	1971220		23			

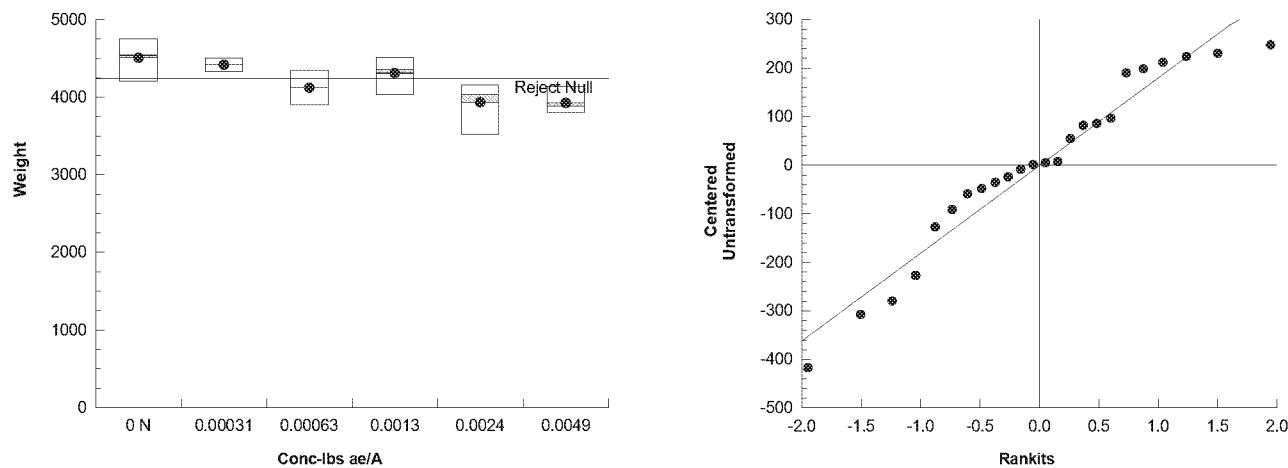
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	4.07	15.1	0.5393	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.884	0.1842	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	4510	4130	4880	4540	4200	4750	118	5.23%	0.00%
0.00031		4	4420	4280	4550	4420	4320	4500	41.8	1.89%	2.00%
0.00063		4	4120	3820	4420	4120	3890	4350	93.3	4.53%	8.60%
0.0013		4	4310	3990	4630	4350	4030	4510	102	4.72%	4.38%
0.0024		4	3930	3460	4400	4030	3510	4160	147	7.49%	12.76%
0.0049		4	3920	3690	4160	3880	3800	4140	73.7	3.75%	12.92%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:18 (p 1 of 4)  
 Test Code/ID: 51017504 diveg / 12-5859-2403

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)				Stoneville R&D, Inc.	
Analysis ID:	19-7387-1064	Endpoint:	Height		CETIS Version: CETISv1.9.5
Analyzed:	07 Apr-20 19:16	Analysis:	Nonlinear Regression (NLR)		Status Level: 1
Batch ID:	04-6105-6410	Test Type:	Vegetative Vigor Tier II		Analyst:
Start Date:	27 Jun-19	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor		Diluent:
Ending Date:		Species:	Glycine max		Brine:
Test Length:	n/a	Taxon:			Source: Age: V4

## Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha [1 - \Phi[\log[x/\delta]/\gamma]]$	Normal [ $\omega=1$ ]	Off [ $\mu^*=\mu$ ]	None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSE	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
5	-23.2	53.5	55.9	0.9280	3.61%	76.4	Yes	2.21	0.1223	Non-Significant Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.000219	0.000117	0.000336
IC10	0.000507	0.000366	0.000668
IC25	0.00207	0.00179	0.00238
IC50	0.00988	0.00724	0.0135

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	76.4	1.33	73.7	79.2	57.6	<1.0E-37	Significant Parameter
$\gamma$	2.32	0.244	1.81	2.83	9.48	<1.0E-37	Significant Parameter
$\delta$	0.00988	0.00142	0.00693	0.0128	6.97	7.0E-07	Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	98500	32800	3	4350	<1.0E-37	Significant
Lack of Fit	42.6	14.2	3	2.21	0.1223	Non-Significant
Pure Error	116	6.44	18			
Residual	158	7.55	21			

## Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.88	2.8	1.0000	No Outliers Detected
Variance	Bartlett Equality of Variance Test	13.3	11.1	0.0204	Unequal Variances
	Mod Levene Equality of Variance	3.77	2.77	0.0165	Unequal Variances
Distribution	Anderson-Darling A2 Normality Test	0.323	2.49	0.5454	Normal Distribution
	Shapiro-Wilk W Normality Test	0.971	0.917	0.6804	Normal Distribution

Height Summary				Calculated Variate					
Conc-lbs ae/A	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	75.9	72.3	81.1	2.03	4.06	5.35%	0.0%
0.00031		4	71.6	68.7	74.4	1.34	2.69	3.76%	5.7%
0.00063		4	69.4	67.7	71.9	0.95	1.9	2.74%	8.56%
0.0013		4	60.3	56.9	63.7	1.47	2.94	4.89%	20.6%
0.0024		4	54.2	52.3	56.2	0.798	1.6	2.94%	28.5%
0.0049		4	48.6	48.4	48.9	0.111	0.222	0.46%	36.0%

# CETIS Analytical Report

Report Date: 07 Apr-20 19:18 (p 2 of 4)  
Test Code/ID: 51017504 diveg / 12-5859-2403

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

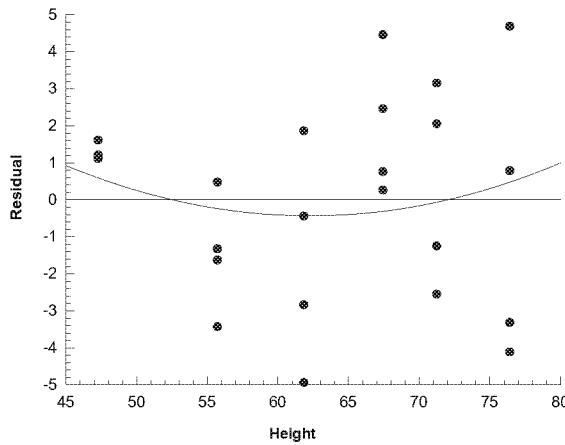
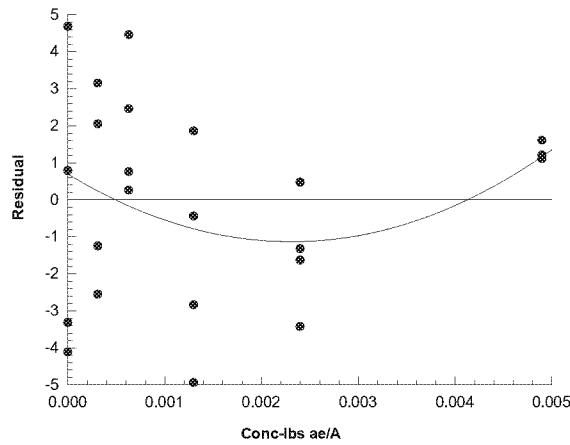
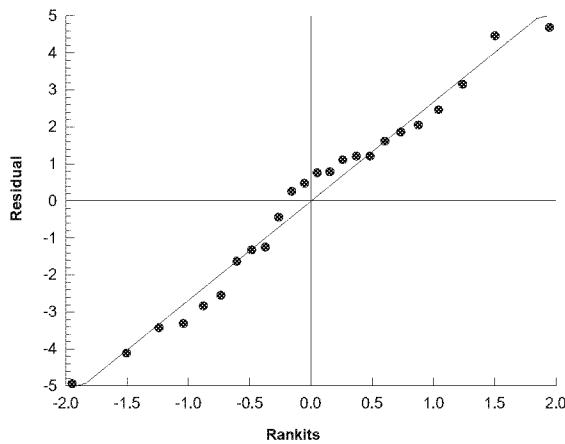
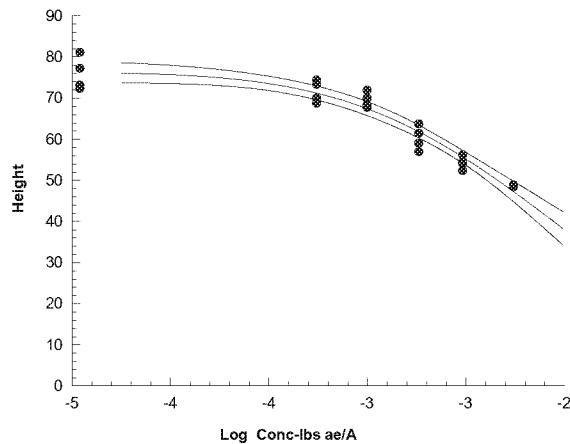
Analysis ID: 19-7387-1064  
Analyzed: 07 Apr-20 19:16

Endpoint: Height  
Analysis: Nonlinear Regression (NLR)

CETIS Version: CETISv1.9.5  
Status Level: 1

### Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]



# CETIS Analytical Report

Report Date: 07 Apr-20 19:18 (p 3 of 4)  
 Test Code/ID: 51017504 diveg / 12-5859-2403

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID: 15-0588-2720	Endpoint: Weight				CETIS Version: CETISv1.9.5	
Analyzed: 07 Apr-20 19:16	Analysis: Nonlinear Regression (NLR)				Status Level: 1	
Batch ID: 04-6105-6410	Test Type: Vegetative Vigor Tier II				Analyst:	
Start Date: 27 Jun-19	Protocol: OCSPP 850.4150 Plant Vegetative Vigor				Diluent:	
Ending Date:	Species: Glycine max				Brine:	
Test Length: n/a	Taxon:				Source:	Age: V4

## Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha [1 - \Phi[\log(x/\delta)/\gamma]]$	Normal [ $\omega=1$ ]	Off [ $\mu^*=\mu$ ]	None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSE	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
7	-128	263	266	0.4458	4.96%	4510	Yes	2.07	0.1401	Non-Significant Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.000502	9.27E-05	0.00134
IC10	0.00221	0.00115	0.0038
IC25	0.0263	0.00224	0.146
IC50	0.413	0.00231	73.7

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	4510	108	4290	4740	41.9	<1.0E-37	Significant Parameter
$\gamma$	4.08	1.67	0.608	7.55	2.44	0.0234	Significant Parameter
$\delta$	0.413	0.79	-1.23	2.05	0.523	0.6064	Non-Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	425000000	142000000	3	2980	<1.0E-37	Significant
Lack of Fit	256000	85300	3	2.07	0.1401	Non-Significant
Pure Error	742000	41200	18			
Residual	997000	47500	21			

## Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.56	2.8	0.1413	No Outliers Detected
Variance	Bartlett Equality of Variance Test	4.07	11.1	0.5393	Equal Variances
	Mod Levene Equality of Variance	0.572	2.77	0.7206	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.385	2.49	0.3970	Normal Distribution
	Shapiro-Wilk W Normality Test	0.958	0.917	0.4059	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	4510	4200	4750	118	236	5.23%	0.0%
0.00031		4	4420	4320	4500	41.8	83.7	1.89%	2.0%
0.00063		4	4120	3890	4350	93.3	187	4.53%	8.6%
0.0013		4	4310	4030	4510	102	204	4.72%	4.38%
0.0024		4	3930	3510	4160	147	294	7.49%	12.8%
0.0049		4	3920	3800	4140	73.7	147	3.75%	12.9%

# CETIS Analytical Report

Report Date: 07 Apr-20 19:18 (p 4 of 4)  
 Test Code/ID: 51017504 diveg / 12-5859-2403

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

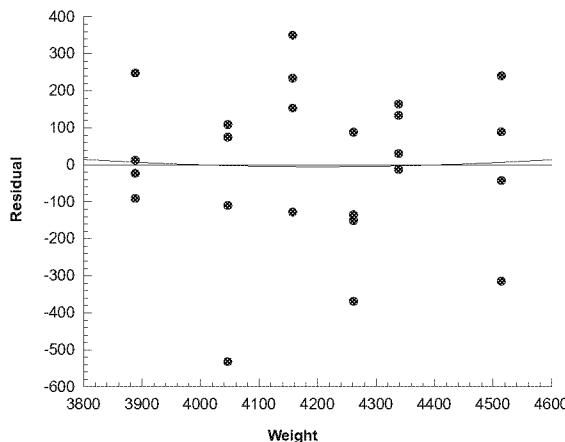
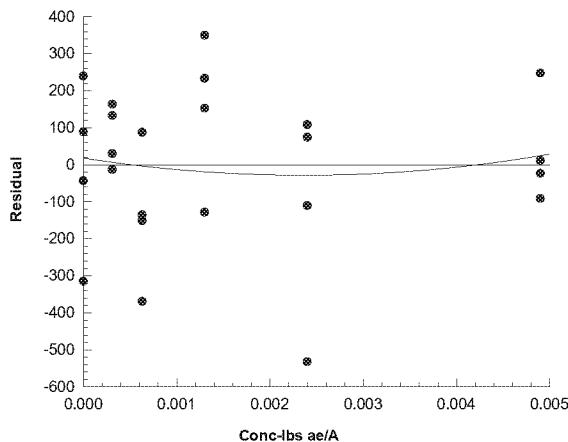
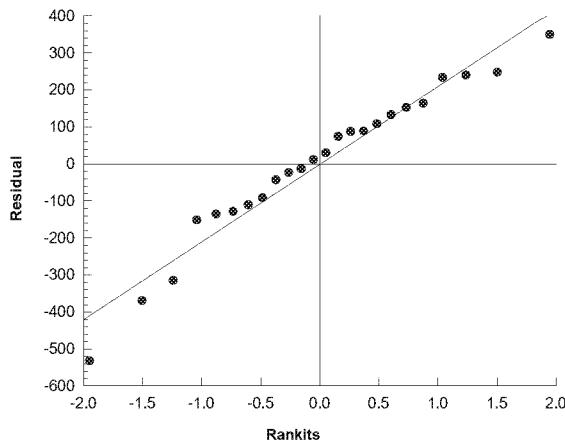
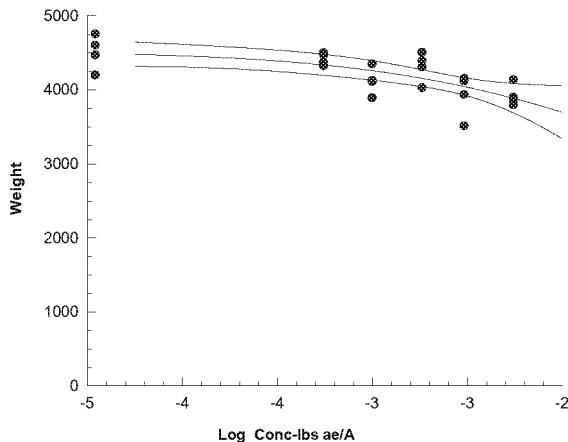
Analysis ID: 15-0588-2720  
 Analyzed: 07 Apr-20 19:16

Endpoint: Weight  
 Analysis: Nonlinear Regression (NLR)

CETIS Version: CETISv1.9.5  
 Status Level: 1

### Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]



# CETIS Analytical Report

Report Date: 21 May-20 21:27 (p 1 of 2)  
 Test Code/ID: 51017504 veg14 / 16-3415-2341

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)				Stoneville R&D, Inc.	
Analysis ID: 08-5049-8483	Endpoint: Height				CETIS Version: CETISv1.9.6
Analyzed: 21 May-20 21:24	Analysis: Nonlinear Regression (NLR)				Status Level: 1
Batch ID: 12-4219-6387	Test Type: Vegetative Vigor Tier II				Analyst:
Start Date: 27 Jun-19	Protocol: OCSPP 850.4150 Plant Vegetative Vigor				Diluent:
Ending Date: 21 May-20 21:22	Species: Glycine max				Brine:
Test Length: 329d 21h	Taxon:				Source: Age:
Sample ID: 10-3423-6567	Code: 3DA53297				Project:
Sample Date: 27 Jun-19	Material: Dicamba DGA				Source: Monsanto Company
Receipt Date: 21 May-20 21:22	CAS (PC):				Station:
Sample Age: n/a	Client: CDM Smith - K. Bozicevich				

## Non-Linear Regression Options

Model Name and Function		Weighting Function		PTBS Function		X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$		Normal [ $\omega=1$ ]		Off [ $\mu^*=\mu$ ]		None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSD	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
6	-21.35	49.9	52.23	0.8951	5.54%	43.21	Yes	2.045	0.1436	Non-Sig Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.0003477	0.0001529	0.000538
IC10	0.0006295	0.0004212	0.0008533
IC15	0.0009395	0.0006985	0.001205
IC20	0.001292	0.001021	0.001592
IC25	0.001697	0.001398	0.00203
IC40	0.003377	0.002832	0.004007
IC50	0.005108	0.004048	0.006444

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	43.21	1.152	40.81	45.6	37.52	<1.0E-37	Significant Parameter
$\gamma$	1.634	0.2251	1.165	2.102	7.256	3.8E-07	Significant Parameter
$\delta$	0.005108	0.000587	0.003887	0.006329	8.701	<1.0E-37	Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	30500	10170	3	1567	<1.0E-37	Significant Effect
Lack of Fit	34.63	11.54	3	2.045	0.1436	Non-Significant Effect
Pure Error	101.6	5.645	18			
Residual	136.2	6.488	21			

## Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Variance	Bartlett Equality of Variance Test	1.612	11.07	0.8999	Equal Variances
	Mod Levene Equality of Variance	0.2809	2.773	0.9175	Equal Variances
Distribution	Anderson-Darling A2 Normality Te	0.3526	2.492	0.4705	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9613	0.9169	0.4652	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	43.5	41	44.9	0.8573	1.715	3.94%	0.0%
0.00031		4	39.75	37.5	42.3	1.014	2.027	5.10%	8.62%
0.00063		4	40.68	37.7	42.8	1.213	2.425	5.96%	6.49%
0.0013		4	34.9	29.9	37.2	1.702	3.405	9.76%	19.77%
0.0024		4	27.8	25	30.5	1.154	2.308	8.30%	36.09%
0.0049		4	22.7	20.6	25.4	1.002	2.005	8.83%	47.82%

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

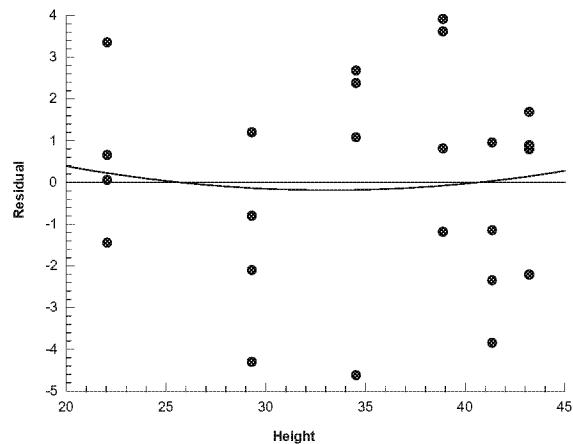
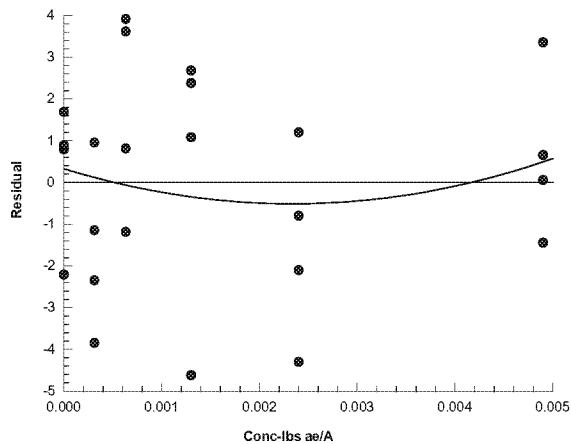
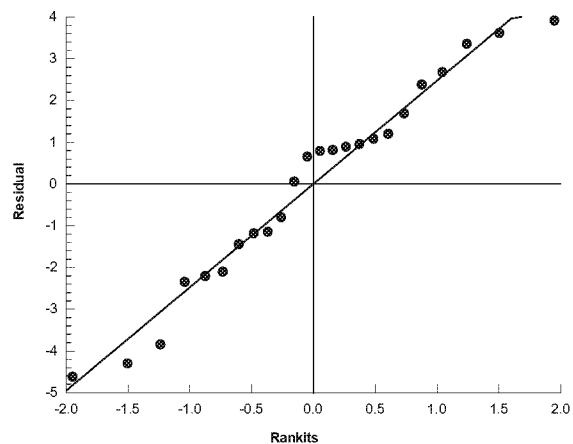
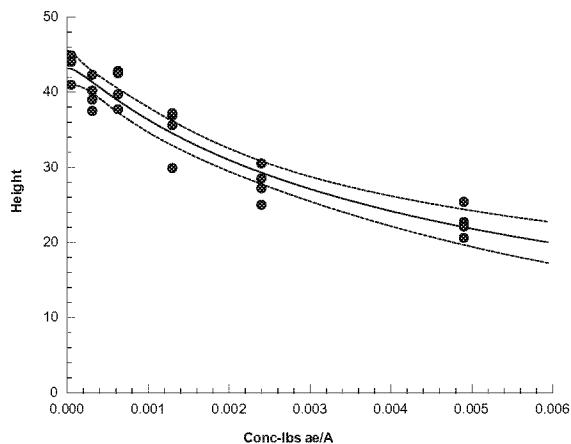
Stoneville R&amp;D, Inc.

Analysis ID: 08-5049-8483  
Analyzed: 21 May-20 21:24Endpoint: Height  
Analysis: Nonlinear Regression (NLR)CETIS Version: CETISv1.9.6  
Status Level: 1

## Height Detail

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	44	41	44.9	44.1
0.00031		37.5	39	40.2	42.3
0.00063		37.7	42.8	42.5	39.7
0.0013		36.9	35.6	37.2	29.9
0.0024		27.2	25	30.5	28.5
0.0049		25.4	22.7	20.6	22.1

## Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]

# CETIS Analytical Report

Report Date: 21 May-20 21:30 (p 1 of 2)  
 Test Code/ID: 51017504 repr14 / 07-2670-8373

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID: 05-8691-7061	Endpoint: Height				CETIS Version: CETISv1.9.6	
Analyzed: 21 May-20 21:18	Analysis: Nonlinear Regression (NLR)				Status Level: 1	
Batch ID: 03-8537-6854	Test Type: Vegetative Vigor Tier II				Analyst:	
Start Date: 11 Jul-19	Protocol: OCSPP 850.4150 Plant Vegetative Vigor				Diluent:	
Ending Date: 21 May-20 21:03	Species: Glycine max				Brine:	
Test Length: 315d 21h	Taxon:				Source:	Age:
Sample ID: 07-6415-1496	Code: 2D8C06C8				Project:	
Sample Date: 11 Jul-19	Material: Dicamba DGA				Source: Monsanto Company	
Receipt Date: 21 May-20 21:03	CAS (PC):				Station:	
Sample Age: n/a	Client: CDM Smith - K. Bozicevich					

## Non-Linear Regression Options

Model Name and Function		Weighting Function		PTBS Function		X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$		Normal [ $\omega=1$ ]		Off [ $\mu^*=\mu$ ]		None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSD	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
10	-33.85	74.9	77.23	0.8492	5.35%	79.01	Yes	2.076	0.1393	Non-Sig Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.0003043	0.0001168	0.0005197
IC10	0.0006549	0.0004096	0.0009425
IC15	0.001098	0.0007919	0.001456
IC20	0.001657	0.001292	0.002077
IC25	0.002357	0.001903	0.002879
IC40	0.005731	0.004192	0.007747
IC50	0.009781	0.006284	0.01522

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	79.01	2.034	74.78	83.24	38.85	<1.0E-37	Significant Parameter
$\gamma$	2.11	0.3471	1.388	2.831	6.078	5.0E-06	Significant Parameter
$\delta$	0.009781	0.001962	0.005701	0.01386	4.985	6.2E-05	Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	108700	36220	3	1970	<1.0E-37	Significant Effect
Lack of Fit	99.25	33.08	3	2.076	0.1393	Non-Significant Effect
Pure Error	286.9	15.94	18			
Residual	386.1	18.39	21			

## Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Variance	Bartlett Equality of Variance Test	4.323	11.07	0.5039	Equal Variances
	Mod Levene Equality of Variance	1.482	2.773	0.2445	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.6178	2.492	0.1087	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9236	0.9169	0.0701	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	78.35	70.5	83.5	2.896	5.791	7.39%	0.0%
0.00032		4	74.32	70.7	78.2	1.756	3.512	4.73%	5.14%
0.00059		4	75.02	71.8	76.9	1.13	2.26	3.01%	4.24%
0.0013		4	64.7	61.8	67.8	1.229	2.458	3.80%	17.42%
0.0025		4	55.55	49.3	62.1	2.751	5.502	9.91%	29.1%
0.005		4	51.28	47.9	54.1	1.442	2.885	5.63%	34.56%

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

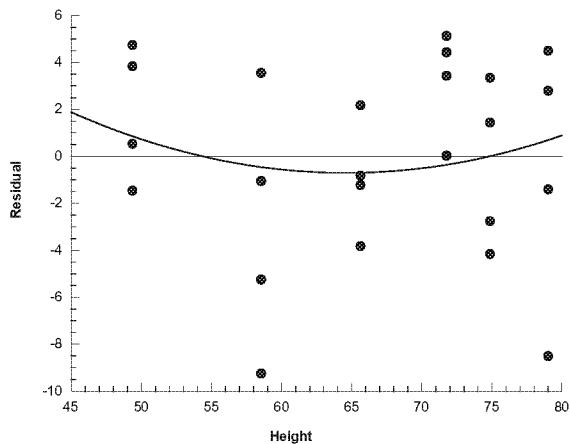
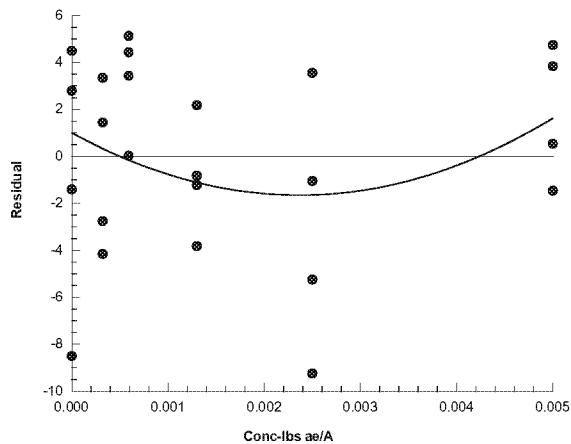
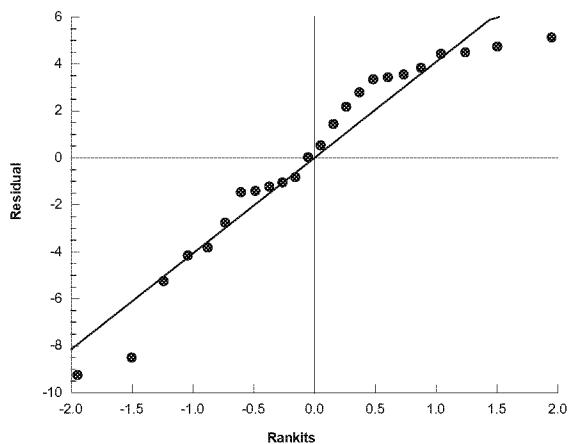
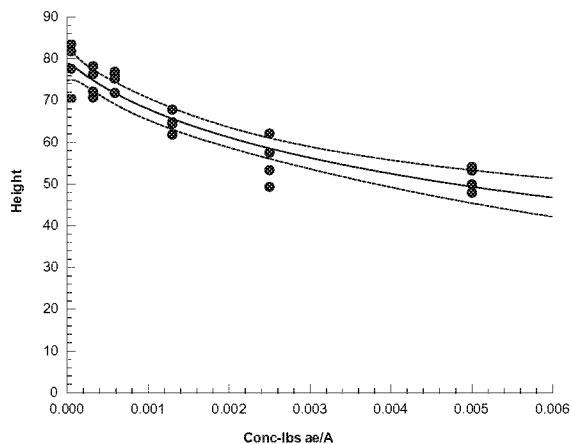
Stoneville R&amp;D, Inc.

Analysis ID: 05-8691-7061  
Analyzed: 21 May-20 21:18Endpoint: Height  
Analysis: Nonlinear Regression (NLR)CETIS Version: CETISv1.9.6  
Status Level: 1

## Height Detail

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	77.6	70.5	83.5	81.8
0.00032		70.7	78.2	72.1	76.3
0.00059		71.8	76.9	76.2	75.2
0.0013		61.8	64.8	64.4	67.8
0.0025		49.3	62.1	57.5	53.3
0.005		53.2	54.1	49.9	47.9

## Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]

# CETIS Analytical Report

Report Date: 21 May-20 21:26 (p 1 of 2)  
 Test Code/ID: 51017504 veg14 / 16-3415-2341

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID: 07-1876-0175	Endpoint: Height				CETIS Version: CETISv1.9.6	
Analyzed: 21 May-20 21:23	Analysis: Parametric-Control vs Ord.Treatments				Status Level: 1	
Batch ID: 12-4219-6387	Test Type: Vegetative Vigor Tier II				Analyst:	
Start Date: 27 Jun-19	Protocol: OCSPP 850.4150 Plant Vegetative Vigor				Diluent:	
Ending Date: 21 May-20 21:22	Species: Glycine max				Brine:	
Test Length: 329d 21h	Taxon:				Source:	Age:
Sample ID: 10-3423-6567	Code: 3DA53297				Project:	
Sample Date: 27 Jun-19	Material: Dicamba DGA				Source: Monsanto Company	
Receipt Date: 21 May-20 21:22	CAS (PC):				Station:	
Sample Age: n/a	Client: CDM Smith - K. Bozicevich					

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	<0.00031	0.00031	n/a		7.21%

## Williams Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control		0.00031*	2.232	1.734	2.913	6	CDF	<0.05	Significant Effect
		0.00063*	1.957	1.818	3.054	6	CDF	<0.05	Significant Effect
		0.0013*	5.119	1.845	3.1	6	CDF	<0.05	Significant Effect
		0.0024*	9.345	1.859	3.123	6	CDF	<0.05	Significant Effect
		0.0049*	12.38	1.867	3.137	6	CDF	<0.05	Significant Effect

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	1320.33	264.066	5	46.78	<1.0E-37	Significant Effect
Error	101.618	5.64542	18			
Total	1421.95		23			

## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	1.612	15.09	0.8999	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9407	0.884	0.1693	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	43.5	40.77	46.23	44.05	41	44.9	0.8573	3.94%	0.00%
0.00031		4	39.75	36.52	42.98	39.6	37.5	42.3	1.014	5.10%	8.62%
0.00063		4	40.68	36.82	44.53	41.1	37.7	42.8	1.213	5.96%	6.49%
0.0013		4	34.9	29.48	40.32	36.25	29.9	37.2	1.702	9.76%	19.77%
0.0024		4	27.8	24.13	31.47	27.85	25	30.5	1.154	8.30%	36.09%
0.0049		4	22.7	19.51	25.89	22.4	20.6	25.4	1.002	8.83%	47.82%

## Height Detail

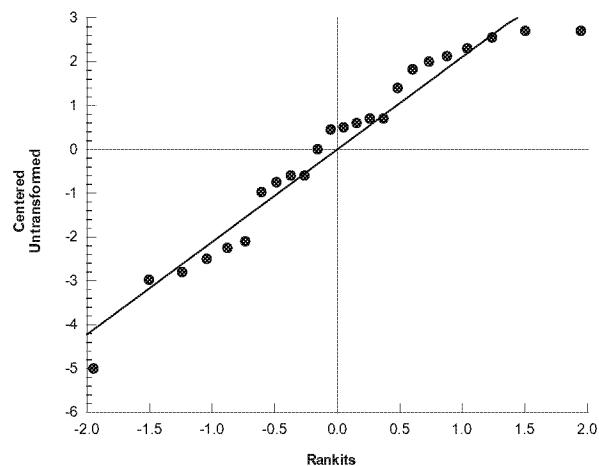
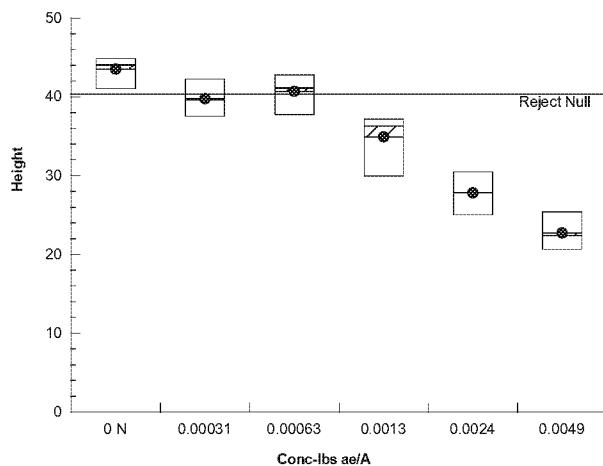
Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	44	41	44.9	44.1
0.00031		37.5	39	40.2	42.3
0.00063		37.7	42.8	42.5	39.7
0.0013		36.9	35.6	37.2	29.9
0.0024		27.2	25	30.5	28.5
0.0049		25.4	22.7	20.6	22.1

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&amp;D, Inc.

Analysis ID: 07-1876-0175  
Analyzed: 21 May-20 21:23Endpoint: Height  
Analysis: Parametric-Control vs Ord.TreatmentsCETIS Version: CETISv1.9.6  
Status Level: 1

## Graphics



# CETIS Analytical Report

Report Date: 21 May-20 21:30 (p 1 of 2)  
 Test Code/ID: 51017504 repr14 / 07-2670-8373

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)							Stoneville R&D, Inc.					
Analysis ID:		Endpoint: Height			CETIS Version:		CETISv1.9.6					
Analyzed:		Analysis: Parametric-Control vs Ord.Treatments			Status Level:		1					
Batch ID:	03-8537-6854	Test Type: Vegetative Vigor Tier II			Analyst:							
Start Date:	11 Jul-19	Protocol: OCSPP 850.4150 Plant Vegetative Vigor			Diluent:							
Ending Date:	21 May-20 21:03	Species: Glycine max			Brine:							
Test Length:	315d 21h	Taxon:			Source:							
Sample ID:	07-6415-1496	Code: 2D8C06C8			Age:							
Sample Date:	11 Jul-19	Material: Dicamba DGA			Project:							
Receipt Date:	21 May-20 21:03	CAS (PC):			Source: Monsanto Company							
Sample Age:	n/a	Client: CDM Smith - K. Bozicevich			Station:							
Data Transform		Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD			
Untransformed		C > T			0.00059	0.0013	0.0008758		6.73%			
Williams Multiple Comparison Test												
Control	vs	Conc-lbs ae/	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha$ :5%)			
Negative Control	0.00032		1.426	1.734	4.895	6	CDF	>0.05	Non-Significant Effect			
	0.00059		1.302	1.818	5.132	6	CDF	>0.05	Non-Significant Effect			
	0.0013*		4.836	1.845	5.208	6	CDF	<0.05	Significant Effect			
	0.0025*		8.077	1.859	5.248	6	CDF	<0.05	Significant Effect			
	0.005*		9.591	1.867	5.27	6	CDF	<0.05	Significant Effect			
ANOVA Table												
Source	Sum Squares		Mean Square		DF	F Stat		P-Value	Decision( $\alpha$ :5%)			
Between	2517.05		503.411		5	31.59		<1.0E-37	Significant Effect			
Error	286.862		15.9368		18							
Total	2803.92				23							
ANOVA Assumptions Tests												
Attribute	Test			Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)					
Variance	Bartlett Equality of Variance Test			4.323	15.09	0.5039	Equal Variances					
Distribution	Shapiro-Wilk W Normality Test			0.9815	0.884	0.9217	Normal Distribution					
Height Summary												
Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
0	N	4	78.35	69.14	87.56	79.7	70.5	83.5	2.896	7.39%	0.00%	
0.00032		4	74.32	68.74	79.91	74.2	70.7	78.2	1.756	4.73%	5.14%	
0.00059		4	75.02	71.43	78.62	75.7	71.8	76.9	1.13	3.01%	4.24%	
0.0013		4	64.7	60.79	68.61	64.6	61.8	67.8	1.229	3.80%	17.42%	
0.0025		4	55.55	46.79	64.31	55.4	49.3	62.1	2.751	9.91%	29.10%	
0.005		4	51.28	46.68	55.87	51.55	47.9	54.1	1.442	5.63%	34.56%	
Height Detail												
Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4							
0	N	77.6	70.5	83.5	81.8							
0.00032		70.7	78.2	72.1	76.3							
0.00059		71.8	76.9	76.2	75.2							
0.0013		61.8	64.8	64.4	67.8							
0.0025		49.3	62.1	57.5	53.3							
0.005		53.2	54.1	49.9	47.9							

# CETIS Analytical Report

Report Date: 21 May-20 21:30 (p 2 of 2)  
Test Code/ID: 51017504 repr14 / 07-2670-8373

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

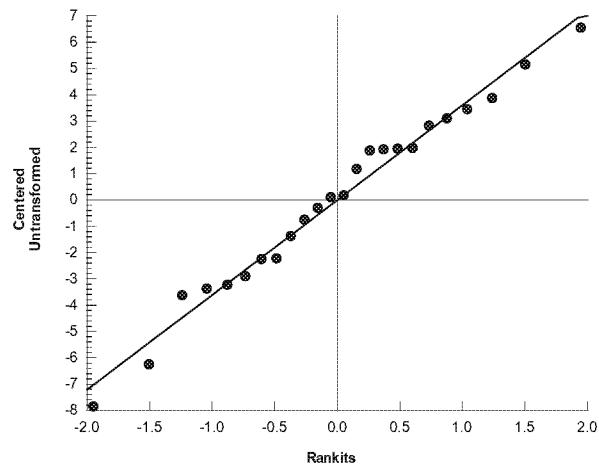
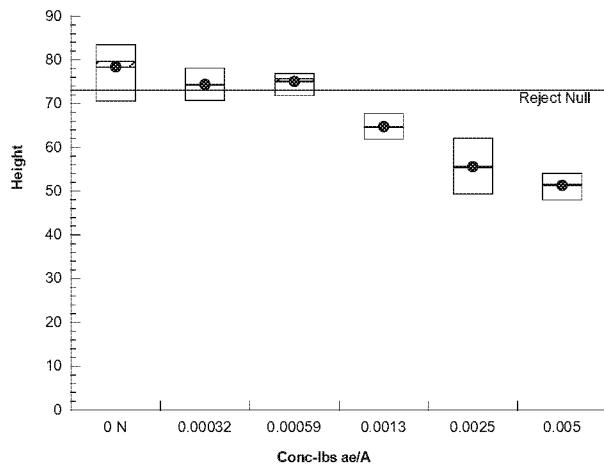
Stoneville R&D, Inc.

Analysis ID: 01-6765-0819  
Analyzed: 21 May-20 21:16

Endpoint: Height  
Analysis: Parametric-Control vs Ord.Treatments

CETIS Version: CETISv1.9.6  
Status Level: 1

### Graphics



**CETIS Summary Report**Report Date: 07 Apr-20 19:22 (p 1 of 2)  
Test Code/ID: 51017504 glyrep / 01-7788-5675**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)****Stoneville R&D, Inc.**

Batch ID:	20-9806-6726	Test Type:	Vegetative Vigor Tier II	Analyst:	
Start Date:	11 Jul-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:	
Ending Date:		Species:	Glycine max	Brine:	
Test Length:	n/a	Taxon:		Source:	Age: R2
Sample ID:	08-8941-3229	Code:	51017504 glyrep	Project:	
Sample Date:	11 Jul-19	Material:	Glyphosate	Source:	Monsanto Company
Receipt Date:		CAS (PC):		Station:	
Sample Age:	1m	Client:	CDM Smith - K. Bozicevich		

128931 51017504; Soybean Yield; Reproductive Stage (R2)

**Multiple Comparison Summary**

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	TU	PMSD	S
04-9067-2301	Height	Dunnett Multiple Comparison Test	✓ <0.0006	0.0006	n/a		5.05%	1
00-9802-8503	Height	Williams Multiple Comparison Test	✓ <0.0006	0.0006	n/a		3.92%	1
09-0770-1275	Weight	Dunnett Multiple Comparison Test	0.0024	0.0046	0.003323		7.61%	1
02-9243-7618	Weight	Williams Multiple Comparison Test	0.0012	0.0024	0.001697		5.9%	1

**Point Estimate Summary**

Analysis ID	Endpoint	Point Estimate Method	✓ Level	Ibs ae/A	95% LCL	95% UCL	TU	S
05-4633-5458	Height	NLR: 3P Cum Log-Normal (Probit)	✓ IC5	0.000432	0.000264	0.000612		1
			✓ IC10	0.000902	0.000697	0.00113		
			✓ IC25	0.00309	0.00273	0.00348		
			✓ IC50	0.0121	0.0101	0.0145		
06-7101-3758	Weight	NLR: 3P Cum Log-Normal (Probit)	IC5	0.00238	0.00123	0.00357		1
			IC10	0.00455	0.00326	0.00596		
			IC25	0.0135	0.00898	0.0191		
			IC50	0.0449	0.0169	0.119		

**Height Summary**

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	106	101	110	102	109	1.43	2.86	2.70%	0.00%
0.0006		4	95.8	90.5	101	92.8	100	1.66	3.32	3.47%	9.41%
0.0012		4	95.7	92	99.4	93.6	98.1	1.16	2.31	2.42%	9.53%
0.0024		4	81.7	76.1	87.4	78.3	84.9	1.78	3.56	4.36%	22.72%
0.0046		4	71.6	65	78.2	68	76.1	2.08	4.15	5.80%	32.32%
0.0099		4	57.3	53.9	60.7	54.9	59.9	1.07	2.15	3.75%	45.82%

**Weight Summary**

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	4490	4250	4730	4340	4690	74.3	149	3.31%	0.00%
0.0006		4	4450	4090	4800	4180	4650	113	225	5.06%	0.97%
0.0012		4	4340	4090	4590	4120	4460	78.4	157	3.61%	3.32%
0.0024		4	4220	3800	4630	3940	4520	130	260	6.17%	6.06%
0.0046		4	4070	3680	4470	3810	4400	123	246	6.04%	9.23%
0.0099		4	3560	3360	3770	3410	3700	63.4	127	3.56%	20.59%

**CETIS Summary Report**Report Date: 07 Apr-20 19:22 (p 2 of 2)  
Test Code/ID: 51017504 glyrep / 01-7788-5675**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)****Stoneville R&D, Inc.****Height Detail**

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	106	102	109	106
0.0006		92.8	100	95.9	94.1
0.0012		98.1	93.8	93.6	97.2
0.0024		79	78.3	84.7	84.9
0.0046		76.1	68.1	74.1	68
0.0099		54.9	56.4	59.9	58

**Weight Detail**

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	4690	4470	4340	4460
0.0006		4650	4340	4610	4180
0.0012		4460	4120	4440	4350
0.0024		4520	4080	4340	3940
0.0046		4400	3810	4070	4020
0.0099		3520	3700	3410	3630

# CETIS Summary Report

Report Date: 07 Apr-20 19:25 (p 1 of 2)  
 Test Code/ID: 51017504 glyveg / 17-6783-9752

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

Batch ID:	08-5153-4444	Test Type:	Vegetative Vigor Tier II	Analyst:	
Start Date:	27 Jun-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:	
Ending Date:		Species:	Glycine max	Brine:	
Test Length:	n/a	Taxon:		Source:	Age: V4
Sample ID:	04-2644-1377	Code:	51017504 glyveg	Project:	
Sample Date:	27 Jun-19	Material:	Glyphosate	Source:	Monsanto Company
Receipt Date:		CAS (PC):		Station:	
Sample Age:	1m	Client:	CDM Smith - K. Bozicevich		

128931 51017504; Soybean Yield; Vegetative Growth Stage (V4)

### Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	TU	PMSD	S
03-5927-4385	Height	Dunnett Multiple Comparison Test	✓ <0.00058	0.00058	n/a		5.69%	1
19-6187-4107	Height	Williams Multiple Comparison Test	✓ <0.00058	0.00058	n/a		4.41%	1
19-2225-2362	Weight	Dunnett Multiple Comparison Test	0.00058	0.0011	0.0007987		7.67%	1
07-1101-1845	Weight	Williams Multiple Comparison Test	0.00058	0.0011	0.0007987		5.95%	1

### Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	Ibs ae/A	95% LCL	95% UCL	TU	S
14-5028-3139	Height	NLR: 3P Cum Log-Normal (Probit)	✓ IC5	0.000357	0.00018	0.000567		1
			✓ IC10	0.000856	0.000606	0.00115		
			✓ IC25	0.00369	0.00316	0.00429		
			✓ IC50	0.0187	0.0135	0.026		
08-6580-3612	Weight	NLR: 3P Cum Log-Normal (Probit)	IC5	0.00087	0.000158	0.00237		1
			IC10	0.00398	0.00204	0.00693		
			IC25	0.0504	0.00429	0.283		
			IC50	0.848	0.00493	146		

### Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	75.9	69.5	82.4	72.3	81.1	2.03	4.06	5.35%	0.00%
0.00058		4	71.6	67.3	75.9	68.7	74.4	1.34	2.69	3.76%	5.70%
0.0011		4	69.4	66.4	72.4	67.7	71.9	0.95	1.9	2.74%	8.56%
0.0022		4	60.3	55.6	64.9	56.9	63.7	1.47	2.94	4.89%	20.65%
0.0043		4	54.2	51.7	56.8	52.3	56.2	0.798	1.6	2.94%	28.55%
0.0092		4	48.6	48.2	48.9	48.4	48.9	0.111	0.222	0.46%	36.02%

### Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	4510	4130	4880	4200	4750	118	236	5.23%	0.00%
0.00058		4	4420	4280	4550	4320	4500	41.8	83.7	1.89%	2.00%
0.0011		4	4120	3820	4420	3890	4350	93.3	187	4.53%	8.60%
0.0022		4	4310	3990	4630	4030	4510	102	204	4.72%	4.38%
0.0043		4	3930	3460	4400	3510	4160	147	294	7.49%	12.76%
0.0092		4	3920	3690	4160	3800	4140	73.7	147	3.75%	12.92%

**CETIS Summary Report**Report Date: 07 Apr-20 19:25 (p 2 of 2)  
Test Code/ID: 51017504 glyveg / 17-6783-9752**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)****Stoneville R&D, Inc.****Height Detail**

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	77.2	73.1	81.1	72.3
0.00058		70	68.7	74.4	73.3
0.0011		67.7	69.9	71.9	68.2
0.0022		59	61.4	63.7	56.9
0.0043		54.1	52.3	54.4	56.2
0.0092		48.5	48.4	48.5	48.9

**Weight Detail**

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	4470	4200	4600	4750
0.00058		4470	4500	4370	4320
0.0011		4110	3890	4350	4130
0.0022		4510	4310	4390	4030
0.0043		4120	4160	3510	3940
0.0092		3900	3860	4140	3800

# CETIS Analytical Report

Report Date: 07 Apr-20 19:21 (p 1 of 4)  
 Test Code/ID: 51017504 glyrep / 01-7788-5675

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.		
Analysis ID: 04-9067-2301 Analyzed: 07 Apr-20 19:20		Endpoint: Height Analysis: Parametric-Control vs Treatments		CETIS Version: CETISv1.9.5 Status Level: 1			
Batch ID: 20-9806-6726	Test Type: Vegetative Vigor Tier II		Analyst:				
Start Date: 11 Jul-19 00:01	Protocol: OCSPP 850.4150 Plant Vegetative Vigor		Diluent:				
Ending Date:	Species: Glycine max		Brine:				
Test Length: n/a	Taxon:		Source:		Age: R2		
Data Transform	Alt Hyp		NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T		<0.0006	0.0006	n/a		5.05%

## Dunnett Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha$ :5%)
Negative Control		0.0006*	4.48	2.41	5.34	6	CDF	6.6E-04	Significant Effect
		0.0012*	4.54	2.41	5.34	6	CDF	5.9E-04	Significant Effect
		0.0024*	10.8	2.41	5.34	6	CDF	2.7E-05	Significant Effect
		0.0046*	15.4	2.41	5.34	6	CDF	2.7E-05	Significant Effect
		0.0099*	21.8	2.41	5.34	6	CDF	2.7E-05	Significant Effect

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :5%)
Outlier	Grubbs Extreme Value Test	1.66	2.8	1.0000	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)
Between	6474.46	1294.89	5	132	<1.0E-37	Significant Effect
Error	177.232	9.84625	18			
Total	6651.7		23			

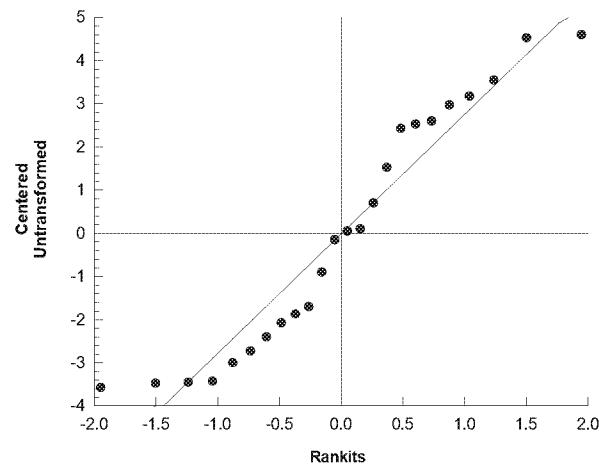
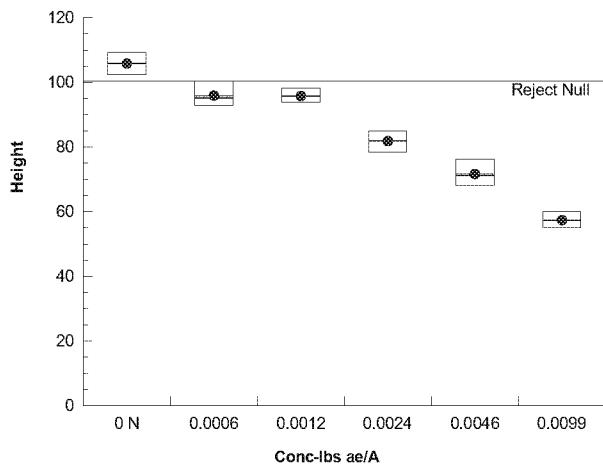
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)
Variance	Bartlett Equality of Variance Test	1.67	15.1	0.8922	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.884	0.0443	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	106	101	110	106	102	109	1.43	2.70%	0.00%
0.0006		4	95.8	90.5	101	95	92.8	100	1.66	3.47%	9.41%
0.0012		4	95.7	92	99.4	95.5	93.6	98.1	1.16	2.42%	9.53%
0.0024		4	81.7	76.1	87.4	81.8	78.3	84.9	1.78	4.36%	22.72%
0.0046		4	71.6	65	78.2	71.1	68	76.1	2.08	5.80%	32.32%
0.0099		4	57.3	53.9	60.7	57.2	54.9	59.9	1.07	3.75%	45.82%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:21 (p 2 of 4)  
 Test Code/ID: 51017504 glyrep / 01-7788-5675

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID: 00-9802-8503 Analyzed: 07 Apr-20 19:20		Endpoint: Height Analysis: Parametric-Control vs Ord.Treatments			CETIS Version: CETISv1.9.5	Status Level: 1
Batch ID: 20-9806-6726	Test Type: Vegetative Vigor Tier II				Analyst:	
Start Date: 11 Jul-19 00:01	Protocol: OCSPP 850.4150 Plant Vegetative Vigor				Diluent:	
Ending Date:	Species: Glycine max				Brine:	
Test Length: n/a	Taxon:				Source:	Age: R2
Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	<0.0006	0.0006	n/a		3.92%

## Williams Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.0006*	4.48	1.73	3.85	6	CDF	<0.05	Significant Effect	
	0.0012*	4.54	1.82	4.03	6	CDF	<0.05	Significant Effect	
	0.0024*	10.8	1.85	4.09	6	CDF	<0.05	Significant Effect	
	0.0046*	15.4	1.86	4.12	6	CDF	<0.05	Significant Effect	
	0.0099*	21.8	1.87	4.14	6	CDF	<0.05	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.66	2.8	1.0000	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	6474.46	1294.89	5	132	<1.0E-37	Significant Effect
Error	177.232	9.84625	18			
Total	6651.7		23			

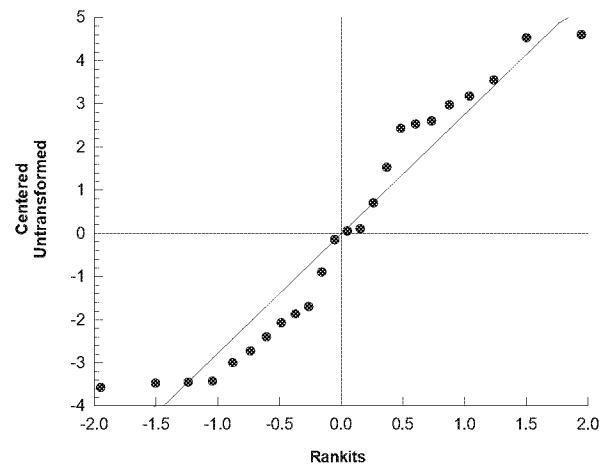
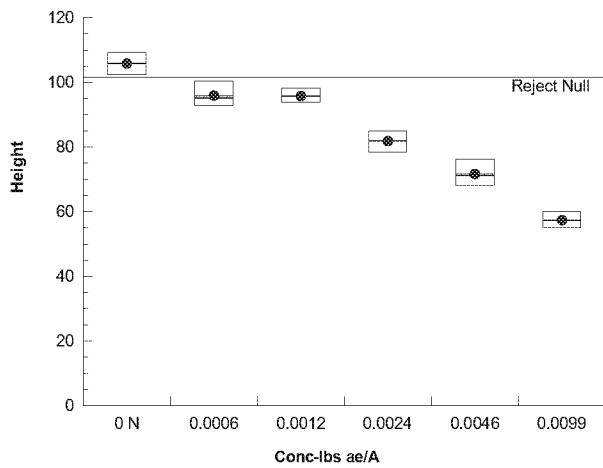
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	1.67	15.1	0.8922	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.884	0.0443	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	106	101	110	106	102	109	1.43	2.70%	0.00%
0.0006		4	95.8	90.5	101	95	92.8	100	1.66	3.47%	9.41%
0.0012		4	95.7	92	99.4	95.5	93.6	98.1	1.16	2.42%	9.53%
0.0024		4	81.7	76.1	87.4	81.8	78.3	84.9	1.78	4.36%	22.72%
0.0046		4	71.6	65	78.2	71.1	68	76.1	2.08	5.80%	32.32%
0.0099		4	57.3	53.9	60.7	57.2	54.9	59.9	1.07	3.75%	45.82%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:21 (p 3 of 4)  
 Test Code/ID: 51017504 glyrep / 01-7788-5675

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.			
Analysis ID:	09-0770-1275	Endpoint:	Weight	CETIS Version:	CETISv1.9.5			
Analyzed:	07 Apr-20 19:20	Analysis:	Parametric-Control vs Treatments	Status Level:	1			
Batch ID:	20-9806-6726	Test Type:	Vegetative Vigor Tier II	Analyst:				
Start Date:	11 Jul-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:				
Ending Date:		Species:	Glycine max	Brine:				
Test Length:	n/a	Taxon:		Source:	Age: R2			
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			0.0024	0.0046	0.003323		7.61%

## Dunnett Multiple Comparison Test

Control	vs	Conc-lbs ae/	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.0006	0.306	2.41	342	6	CDF	0.7277	Non-Significant Effect	
	0.0012	1.05	2.41	342	6	CDF	0.4001	Non-Significant Effect	
	0.0024	1.92	2.41	342	6	CDF	0.1200	Non-Significant Effect	
	0.0046*	2.92	2.41	342	6	CDF	0.0182	Significant Effect	
	0.0099*	6.51	2.41	342	6	CDF	3.5E-05	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.86	2.8	1.0000	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	2328470	465694	5	11.6	4.1E-05	Significant Effect
Error	725251	40291.7	18			
Total	3053720		23			

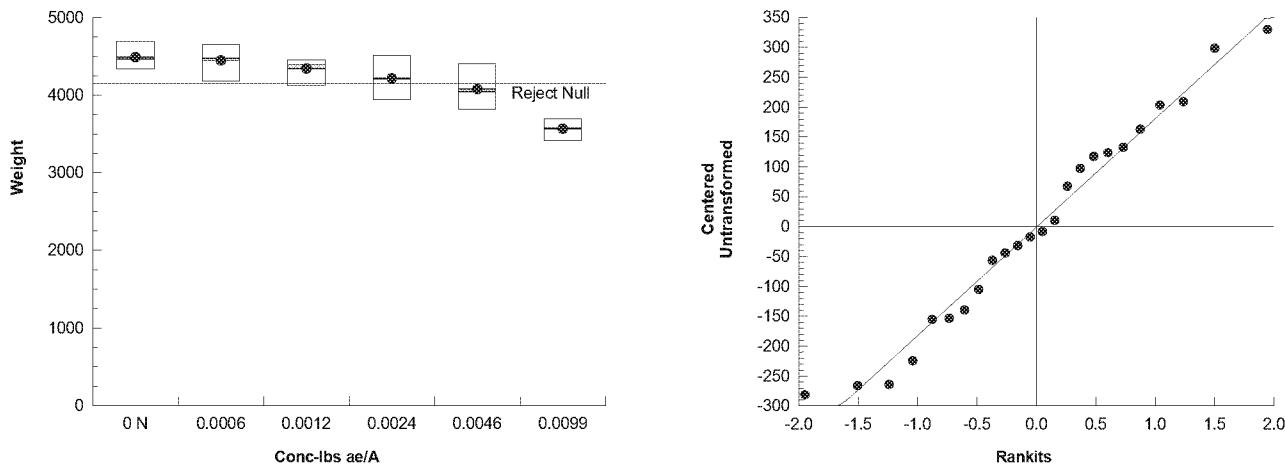
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	2.27	15.1	0.8103	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.884	0.5996	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	4490	4250	4730	4460	4340	4690	74.3	3.31%	0.00%
0.0006		4	4450	4090	4800	4470	4180	4650	113	5.06%	0.97%
0.0012		4	4340	4090	4590	4390	4120	4460	78.4	3.61%	3.32%
0.0024		4	4220	3800	4630	4210	3940	4520	130	6.17%	6.06%
0.0046		4	4070	3680	4470	4040	3810	4400	123	6.04%	9.23%
0.0099		4	3560	3360	3770	3580	3410	3700	63.4	3.56%	20.59%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:21 (p 4 of 4)  
 Test Code/ID: 51017504 glyrep / 01-7788-5675

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.			
Analysis ID:	02-9243-7618	Endpoint:	Weight	CETIS Version:	CETISv1.9.5			
Analyzed:	07 Apr-20 19:20	Analysis:	Parametric-Control vs Ord.Treatments	Status Level:	1			
Batch ID:	20-9806-6726	Test Type:	Vegetative Vigor Tier II	Analyst:				
Start Date:	11 Jul-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:				
Ending Date:		Species:	Glycine max	Brine:				
Test Length:	n/a	Taxon:		Source:	Age: R2			
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			0.0012	0.0024	0.001697		5.90%

## Williams Multiple Comparison Test

Control	vs	Conc-lbs ae/A	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.0006	0.306	1.73	246	6	CDF	>0.05	Non-Significant Effect	
	0.0012	1.05	1.82	258	6	CDF	>0.05		
	0.0024*	1.92	1.85	262	6	CDF	<0.05		Significant Effect
	0.0046*	2.92	1.86	264	6	CDF	<0.05		Significant Effect
	0.0099*	6.51	1.87	265	6	CDF	<0.05		Significant Effect

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.86	2.8	1.0000	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	2328470	465694	5	11.6	4.1E-05	Significant Effect
Error	725251	40291.7	18			
Total	3053720		23			

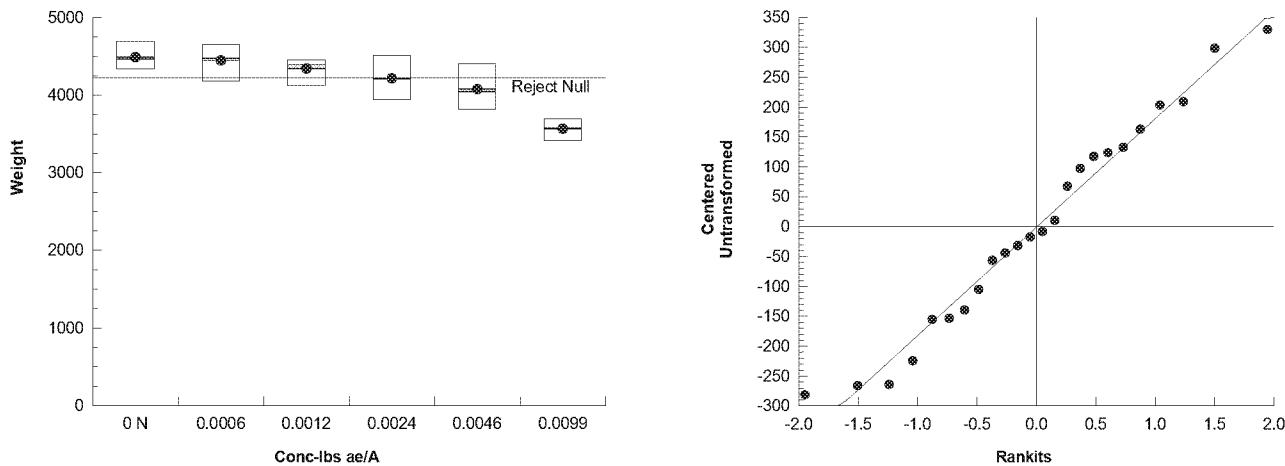
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	2.27	15.1	0.8103	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.884	0.5996	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	4490	4250	4730	4460	4340	4690	74.3	3.31%	0.00%
0.0006		4	4450	4090	4800	4470	4180	4650	113	5.06%	0.97%
0.0012		4	4340	4090	4590	4390	4120	4460	78.4	3.61%	3.32%
0.0024		4	4220	3800	4630	4210	3940	4520	130	6.17%	6.06%
0.0046		4	4070	3680	4470	4040	3810	4400	123	6.04%	9.23%
0.0099		4	3560	3360	3770	3580	3410	3700	63.4	3.56%	20.59%

## Graphics



**CETIS Analytical Report**

Report Date: 07 Apr-20 19:21 (p 1 of 4)  
 Test Code/ID: 51017504 glyrep / 01-7788-5675

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID:	05-4633-5458	Endpoint:	Height		CETIS Version:	CETISv1.9.5
Analyzed:	07 Apr-20 19:20	Analysis:	Nonlinear Regression (NLR)			Status Level: 1
Batch ID:	20-9806-6726	Test Type:	Vegetative Vigor Tier II		Analyst:	
Start Date:	11 Jul-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor			Diluent:
Ending Date:		Species:	Glycine max		Brine:	
Test Length:	n/a	Taxon:				Source: Age: R2

**Non-Linear Regression Options**

Model Name and Function			Weighting Function		PTBS Function		X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha [1 - \Phi[\log(x/\delta)/\gamma]]$			Normal [ $\omega=1$ ]		Off [ $\mu^*=\mu$ ]		None	None

**Regression Summary**

Iters	Log LL	AICc	BIC	Adj R2	PMSD	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
4	-29.2	65.5	67.8	0.9570	3.32%	105	Yes	2.84	0.0669	Non-Significant Lack of Fit

**Point Estimates**

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.000432	0.000264	0.000612
IC10	0.000902	0.000697	0.00113
IC25	0.00309	0.00273	0.00348
IC50	0.0121	0.0101	0.0145

**Regression Parameters**

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	105	1.68	102	109	62.6	<1.0E-37	Significant Parameter
$\gamma$	2.03	0.163	1.69	2.37	12.4	<1.0E-37	Significant Parameter
$\delta$	0.0121	0.00107	0.00991	0.0143	11.4	<1.0E-37	Significant Parameter

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	178000	59400	3	4780	<1.0E-37	Significant
Lack of Fit	84	28	3	2.84	0.0669	Non-Significant
Pure Error	177	9.85	18			
Residual	261	12.4	21			

**Residual Analysis**

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.79	2.8	1.0000	No Outliers Detected
Variance	Bartlett Equality of Variance Test	1.67	11.1	0.8922	Equal Variances
	Mod Levene Equality of Variance	1.28	2.77	0.3164	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.607	2.49	0.1158	Normal Distribution
	Shapiro-Wilk W Normality Test	0.943	0.917	0.1864	Normal Distribution

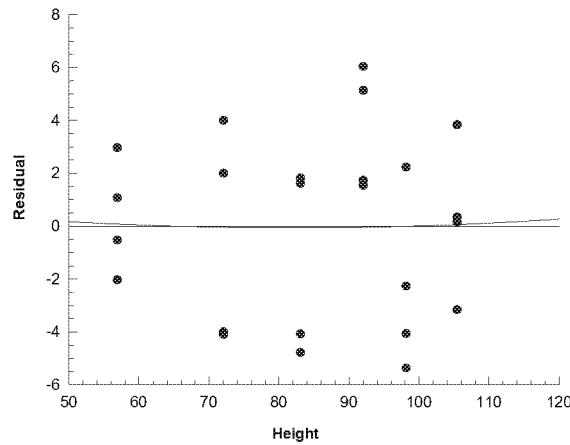
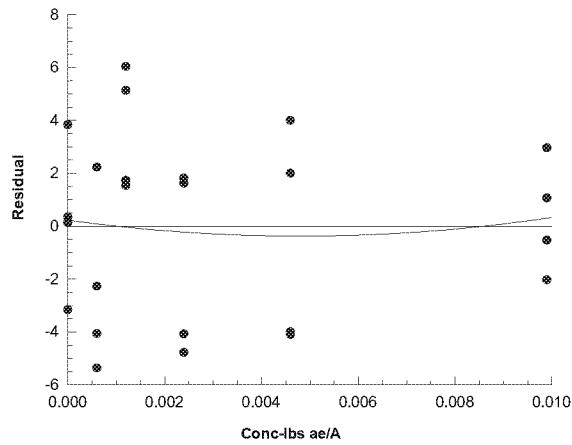
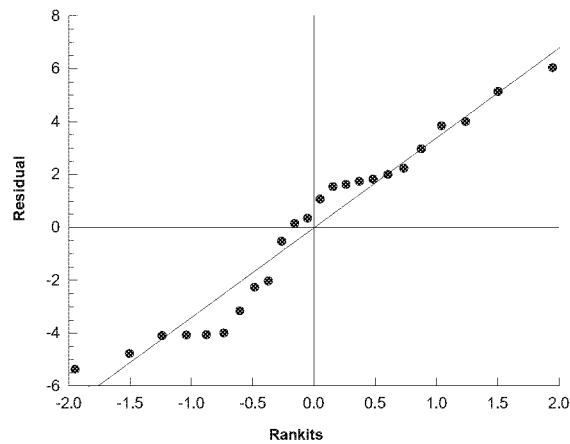
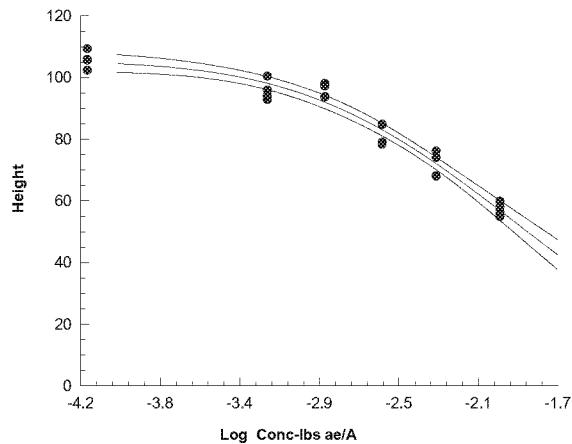
			Calculated Variate						
Conc-lbs ae/A	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	106	102	109	1.43	2.86	2.70%	0.0%
0.0006		4	95.8	92.8	100	1.66	3.32	3.47%	9.41%
0.0012		4	95.7	93.6	98.1	1.16	2.31	2.42%	9.53%
0.0024		4	81.7	78.3	84.9	1.78	3.56	4.36%	22.7%
0.0046		4	71.6	68	76.1	2.08	4.15	5.80%	32.3%
0.0099		4	57.3	54.9	59.9	1.07	2.15	3.75%	45.8%

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&amp;D, Inc.

Analysis ID: 05-4633-5458  
Analyzed: 07 Apr-20 19:20Endpoint: Height  
Analysis: Nonlinear Regression (NLR)CETIS Version: CETISv1.9.5  
Status Level: 1

## Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]

## CETIS Analytical Report

Report Date: 07 Apr-20 19:21 (p 3 of 4)  
 Test Code/ID: 51017504 glyrep / 01-7788-5675

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID:	06-7101-3758	Endpoint:	Weight		CETIS Version:	CETISv1.9.5
Analyzed:	07 Apr-20 19:20	Analysis:	Nonlinear Regression (NLR)		Status Level:	1
Batch ID:	20-9806-6726	Test Type:	Vegetative Vigor Tier II		Analyst:	
Start Date:	11 Jul-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor		Diluent:	
Ending Date:		Species:	Glycine max		Brine:	
Test Length:	n/a	Taxon:			Source:	Age: R2

## Non-Linear Regression Options

Model Name and Function			Weighting Function		PTBS Function		X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha [1 - \Phi[\log(x/\delta)/\gamma]]$			Normal [ $\omega=1$ ]		Off [ $\mu^*=\mu$ ]		None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSE	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
8	-125	257	259	0.7314	3.54%	4470	Yes	0.195	0.8982	Non-Significant Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.00238	0.00123	0.00357
IC10	0.00455	0.00326	0.00596
IC25	0.0135	0.00898	0.0191
IC50	0.0449	0.0169	0.119

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	4470	76.1	4310	4630	58.8	<1.0E-37	Significant Parameter
$\gamma$	1.79	0.467	0.815	2.76	3.83	9.9E-04	Significant Parameter
$\delta$	0.0449	0.0192	0.00496	0.0849	2.34	0.0294	Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	423000000	141000000	3	3960	<1.0E-37	Significant
Lack of Fit	23600	7870	3	0.195	0.8982	Non-Significant
Pure Error	725000	40300	18			
Residual	749000	35700	21			

## Residual Analysis

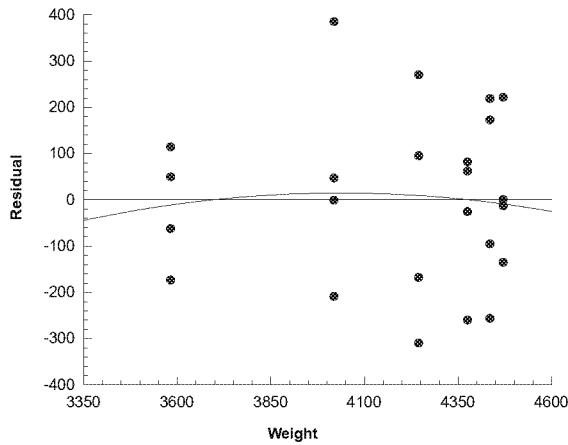
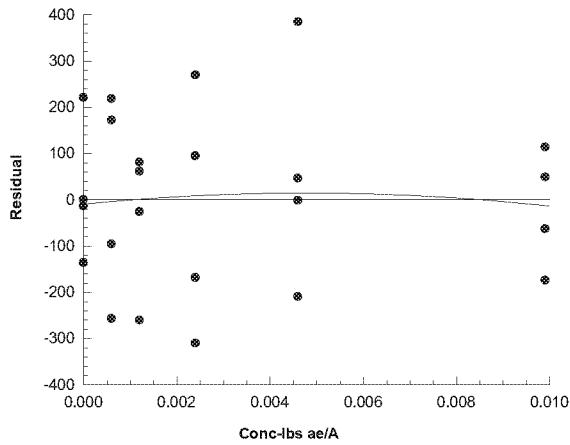
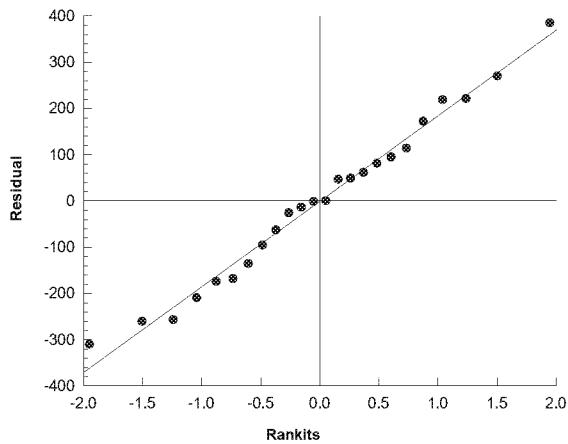
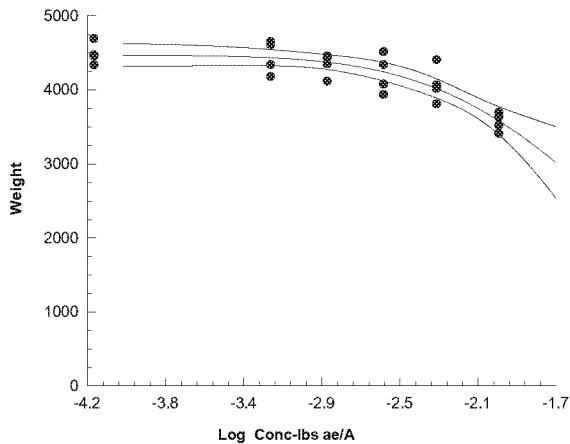
Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.13	2.8	0.6196	No Outliers Detected
Variance	Bartlett Equality of Variance Test	2.27	11.1	0.8103	Equal Variances
	Mod Levene Equality of Variance	0.855	2.77	0.5295	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.169	2.49	0.9877	Normal Distribution
	Shapiro-Wilk W Normality Test	0.982	0.917	0.9306	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	4490	4340	4690	74.3	149	3.31%	0.0%
0.0006		4	4450	4180	4650	113	225	5.06%	0.97%
0.0012		4	4340	4120	4460	78.4	157	3.61%	3.32%
0.0024		4	4220	3940	4520	130	260	6.17%	6.06%
0.0046		4	4070	3810	4400	123	246	6.04%	9.23%
0.0099		4	3560	3410	3700	63.4	127	3.56%	20.6%

**CETIS Analytical Report**Report Date: 07 Apr-20 19:21 (p 4 of 4)  
Test Code/ID: 51017504 glyrep / 01-7788-5675**OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)**

Stoneville R&amp;D, Inc.

Analysis ID: 06-7101-3758  
Analyzed: 07 Apr-20 19:20Endpoint: Weight  
Analysis: Nonlinear Regression (NLR)CETIS Version: CETISv1.9.5  
Status Level: 1**Graphics**Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]

# CETIS Analytical Report

Report Date: 07 Apr-20 19:24 (p 1 of 4)  
 Test Code/ID: 51017504 glyveg / 17-6783-9752

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)				Stoneville R&D, Inc.				
Analysis ID:	03-5927-4385	Endpoint:	Height	CETIS Version:	CETISv1.9.5			
Analyzed:	07 Apr-20 19:23	Analysis:	Parametric-Control vs Treatments	Status Level:	1			
Batch ID:	08-5153-4444	Test Type:	Vegetative Vigor Tier II	Analyst:				
Start Date:	27 Jun-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:				
Ending Date:		Species:	Glycine max	Brine:				
Test Length:	n/a	Taxon:		Source:	Age: V4			
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			<0.00058	0.00058	n/a		5.69%

## Dunnett Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha$ :5%)
Negative Control	0.00058*	2.41	2.41	4.32	6	CDF	0.0496	Significant Effect	
	0.0011*	3.62	2.41	4.32	6	CDF	0.0041	Significant Effect	
	0.0022*	8.74	2.41	4.32	6	CDF	2.7E-05	Significant Effect	
	0.0043*	12.1	2.41	4.32	6	CDF	2.7E-05	Significant Effect	
	0.0092*	15.2	2.41	4.32	6	CDF	2.7E-05	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :5%)
Outlier	Grubbs Extreme Value Test	2.31	2.8	0.3554	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)
Between	2295.27	459.055	5	71.3	<1.0E-37	Significant Effect
Error	115.863	6.43681	18			
Total	2411.14		23			

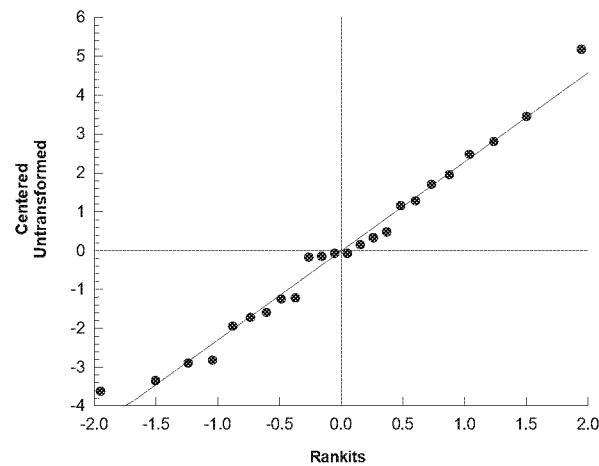
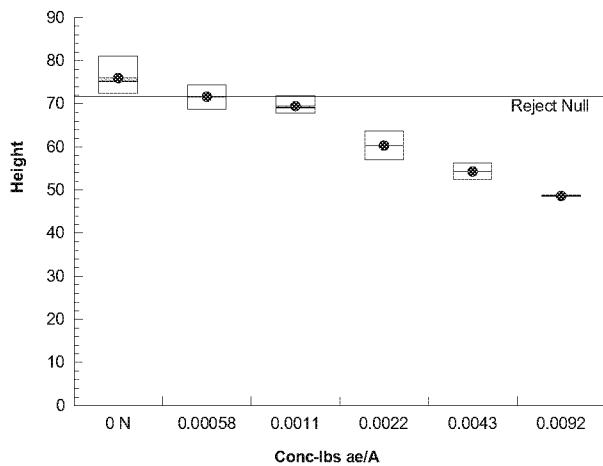
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)
Variance	Bartlett Equality of Variance Test	13.3	15.1	0.0204	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.884	0.8441	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	75.9	69.5	82.4	75.1	72.3	81.1	2.03	5.35%	0.00%
0.00058		4	71.6	67.3	75.9	71.7	68.7	74.4	1.34	3.76%	5.70%
0.0011		4	69.4	66.4	72.4	69.1	67.7	71.9	0.95	2.74%	8.56%
0.0022		4	60.3	55.6	64.9	60.2	56.9	63.7	1.47	4.89%	20.65%
0.0043		4	54.2	51.7	56.8	54.2	52.3	56.2	0.798	2.94%	28.55%
0.0092		4	48.6	48.2	48.9	48.5	48.4	48.9	0.111	0.46%	36.02%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:24 (p 2 of 4)  
 Test Code/ID: 51017504 glyveg / 17-6783-9752

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.			
Analysis ID:	19-6187-4107	Endpoint:	Height	CETIS Version:	CETISv1.9.5			
Analyzed:	07 Apr-20 19:23	Analysis:	Parametric-Control vs Ord.Treatments	Status Level:	1			
Batch ID:	08-5153-4444	Test Type:	Vegetative Vigor Tier II	Analyst:				
Start Date:	27 Jun-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:				
Ending Date:		Species:	Glycine max	Brine:				
Test Length:	n/a	Taxon:		Source:	Age: V4			
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			<0.00058	0.00058	n/a		4.41%

## Williams Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.00058*		2.41	1.73	3.11	6	CDF	<0.05	Significant Effect
	0.0011*		3.62	1.82	3.26	6	CDF	<0.05	Significant Effect
	0.0022*		8.74	1.85	3.31	6	CDF	<0.05	Significant Effect
	0.0043*		12.1	1.86	3.34	6	CDF	<0.05	Significant Effect
	0.0092*		15.2	1.87	3.35	6	CDF	<0.05	Significant Effect

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.31	2.8	0.3554	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	2295.27	459.055	5	71.3	<1.0E-37	Significant Effect
Error	115.863	6.43681	18			
Total	2411.14		23			

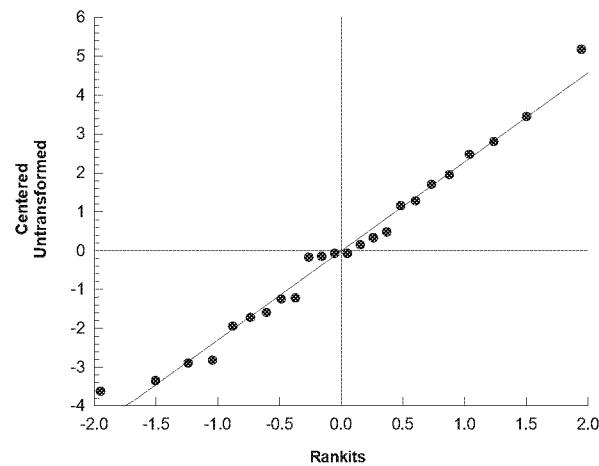
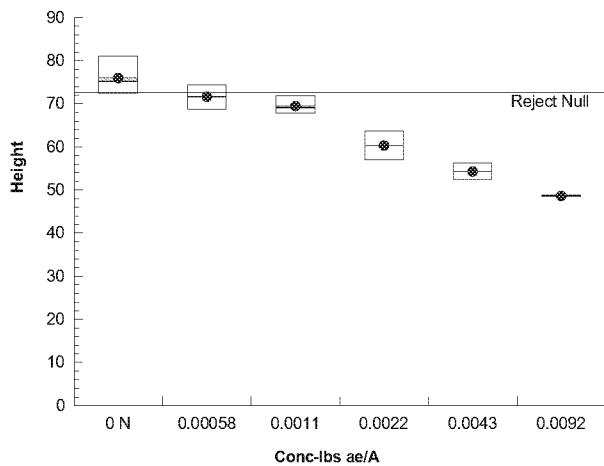
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	13.3	15.1	0.0204	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.884	0.8441	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	75.9	69.5	82.4	75.1	72.3	81.1	2.03	5.35%	0.00%
0.00058		4	71.6	67.3	75.9	71.7	68.7	74.4	1.34	3.76%	5.70%
0.0011		4	69.4	66.4	72.4	69.1	67.7	71.9	0.95	2.74%	8.56%
0.0022		4	60.3	55.6	64.9	60.2	56.9	63.7	1.47	4.89%	20.65%
0.0043		4	54.2	51.7	56.8	54.2	52.3	56.2	0.798	2.94%	28.55%
0.0092		4	48.6	48.2	48.9	48.5	48.4	48.9	0.111	0.46%	36.02%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:24 (p 3 of 4)  
 Test Code/ID: 51017504 glyveg / 17-6783-9752

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.				
Analysis ID: 19-2225-2362 Analyzed: 07 Apr-20 19:23		Endpoint: Weight Analysis: Parametric-Control vs Treatments			CETIS Version: CETISv1.9.5 Status Level: 1				
Batch ID: 08-5153-4444	Start Date: 27 Jun-19 00:01	Test Type: Vegetative Vigor Tier II Protocol: OCSPP 850.4150 Plant Vegetative Vigor			Analyst:				
Ending Date:		Species: Glycine max			Diluent:				
Test Length: n/a		Taxon:			Brine:				
					Source:	Age: V4			
Data Transform	Alt Hyp				NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T				0.00058	0.0011	0.0007987		7.67%

## Dunnett Multiple Comparison Test

Control	vs	Conc-lbs ae/A	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.00058	0.629	2.41	345	6	CDF	0.5904	Non-Significant Effect	
	0.0011*	2.7	2.41	345	6	CDF	0.0283	Significant Effect	
	0.0022	1.38	2.41	345	6	CDF	0.2700	Non-Significant Effect	
	0.0043*	4.01	2.41	345	6	CDF	0.0018	Significant Effect	
	0.0092*	4.06	2.41	345	6	CDF	0.0016	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.33	2.8	0.3329	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	1229630	245925	5	5.97	0.0020	Significant Effect
Error	741595	41199.7	18			
Total	1971220		23			

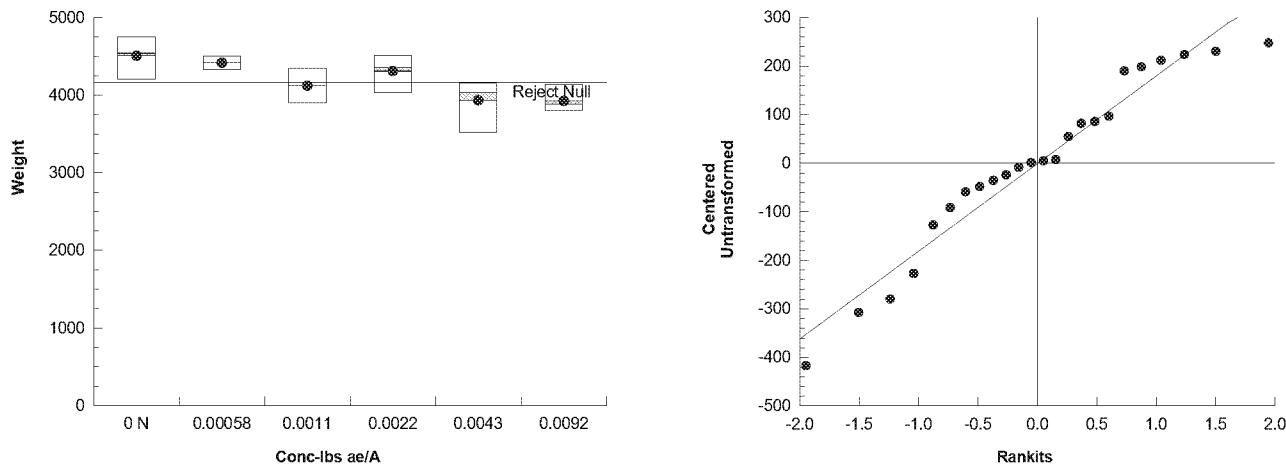
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	4.07	15.1	0.5393	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.884	0.1842	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	4510	4130	4880	4540	4200	4750	118	5.23%	0.00%
0.00058		4	4420	4280	4550	4420	4320	4500	41.8	1.89%	2.00%
0.0011		4	4120	3820	4420	4120	3890	4350	93.3	4.53%	8.60%
0.0022		4	4310	3990	4630	4350	4030	4510	102	4.72%	4.38%
0.0043		4	3930	3460	4400	4030	3510	4160	147	7.49%	12.76%
0.0092		4	3920	3690	4160	3880	3800	4140	73.7	3.75%	12.92%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:24 (p 4 of 4)  
 Test Code/ID: 51017504 glyveg / 17-6783-9752

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.			
Analysis ID: 07-1101-1845 Analyzed: 07 Apr-20 19:23		Endpoint: Weight Analysis: Parametric-Control vs Ord.Treatments			CETIS Version: CETISv1.9.5 Status Level: 1			
Batch ID: 08-5153-4444 Start Date: 27 Jun-19 00:01 Ending Date: Test Length: n/a	Test Type: Vegetative Vigor Tier II Protocol: OCSPP 850.4150 Plant Vegetative Vigor Species: Glycine max Taxon:			Analyst: Diluent: Brine: Source:				
						Age: V4		
Data Transform	Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T			0.00058	0.0011	0.0007987		5.95%

## Williams Multiple Comparison Test

Control	vs	Conc-lbs ae/A	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )
Negative Control	0.00058	0.629	1.73	249	6	CDF	>0.05	Non-Significant Effect	
	0.0011*	2.7	1.82	261	6	CDF	<0.05	Significant Effect	
	0.0022*	2.04	1.85	265	6	CDF	<0.05	Significant Effect	
	0.0043*	4.01	1.86	267	6	CDF	<0.05	Significant Effect	
	0.0092*	4.06	1.87	268	6	CDF	<0.05	Significant Effect	

## Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.33	2.8	0.3329	No Outliers Detected

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Between	1229630	245925	5	5.97	0.0020	Significant Effect
Error	741595	41199.7	18			
Total	1971220		23			

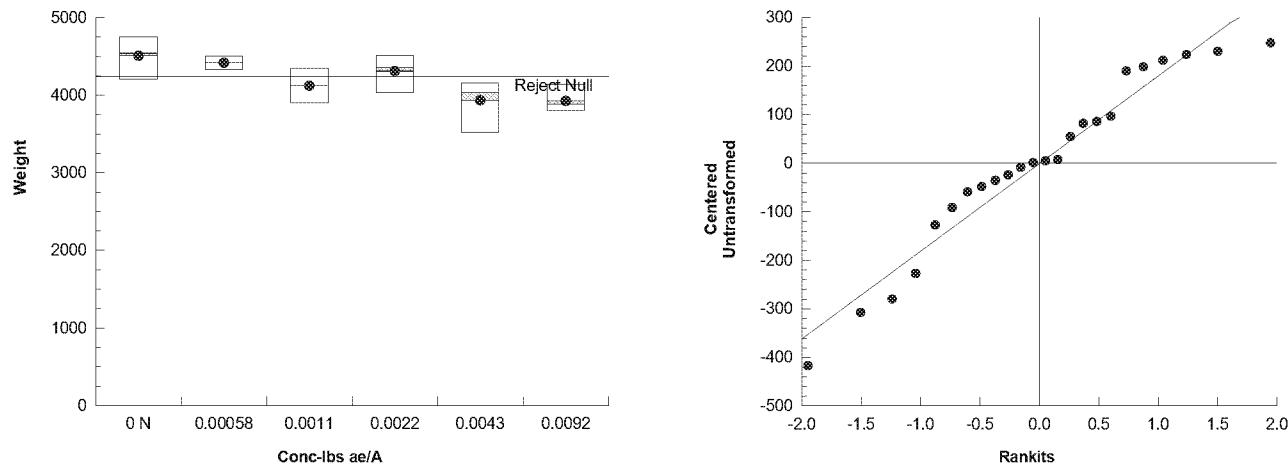
## ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )
Variance	Bartlett Equality of Variance Test	4.07	15.1	0.5393	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.884	0.1842	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	4510	4130	4880	4540	4200	4750	118	5.23%	0.00%
0.00058		4	4420	4280	4550	4420	4320	4500	41.8	1.89%	2.00%
0.0011		4	4120	3820	4420	4120	3890	4350	93.3	4.53%	8.60%
0.0022		4	4310	3990	4630	4350	4030	4510	102	4.72%	4.38%
0.0043		4	3930	3460	4400	4030	3510	4160	147	7.49%	12.76%
0.0092		4	3920	3690	4160	3880	3800	4140	73.7	3.75%	12.92%

## Graphics



# CETIS Analytical Report

Report Date: 07 Apr-20 19:25 (p 1 of 4)  
 Test Code/ID: 51017504 glyveg / 17-6783-9752

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID: 14-5028-3139	Endpoint: Height			CETIS Version:	CETISv1.9.5	
Analyzed: 07 Apr-20 19:23	Analysis: Nonlinear Regression (NLR)			Status Level:	1	
Batch ID: 08-5153-4444	Test Type: Vegetative Vigor Tier II			Analyst:		
Start Date: 27 Jun-19 00:01	Protocol: OCSPP 850.4150 Plant Vegetative Vigor			Diluent:		
Ending Date:	Species: Glycine max			Brine:		
Test Length: n/a	Taxon:			Source:	Age: V4	

## Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha [1 - \Phi[\log[x/\delta]/\gamma]]$	Normal [ $\omega=1$ ]	Off [ $\mu^*=\mu$ ]	None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSE	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
6	-24	55.2	57.6	0.9227	3.76%	76.5	Yes	2.81	0.0690	Non-Significant Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.000357	0.00018	0.000567
IC10	0.000856	0.000606	0.00115
IC25	0.00369	0.00316	0.00429
IC50	0.0187	0.0135	0.026

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	76.5	1.38	73.7	79.4	55.3	<1.0E-37	Significant Parameter
$\gamma$	2.41	0.258	1.87	2.94	9.35	<1.0E-37	Significant Parameter
$\delta$	0.0187	0.00287	0.0128	0.0247	6.53	1.8E-06	Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	98500	32800	3	4050	<1.0E-37	Significant
Lack of Fit	54.2	18.1	3	2.81	0.0690	Non-Significant
Pure Error	116	6.44	18			
Residual	170	8.1	21			

## Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	1.96	2.8	1.0000	No Outliers Detected
Variance	Bartlett Equality of Variance Test	13.3	11.1	0.0204	Unequal Variances
	Mod Levene Equality of Variance	3.77	2.77	0.0165	Unequal Variances
Distribution	Anderson-Darling A2 Normality Test	0.314	2.49	0.5722	Normal Distribution
	Shapiro-Wilk W Normality Test	0.969	0.917	0.6501	Normal Distribution

Height Summary					Calculated Variate				
Conc-lbs ae/A	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	75.9	72.3	81.1	2.03	4.06	5.35%	0.0%
0.00058		4	71.6	68.7	74.4	1.34	2.69	3.76%	5.7%
0.0011		4	69.4	67.7	71.9	0.95	1.9	2.74%	8.56%
0.0022		4	60.3	56.9	63.7	1.47	2.94	4.89%	20.6%
0.0043		4	54.2	52.3	56.2	0.798	1.6	2.94%	28.5%
0.0092		4	48.6	48.4	48.9	0.111	0.222	0.46%	36.0%

# CETIS Analytical Report

Report Date: 07 Apr-20 19:25 (p 2 of 4)  
 Test Code/ID: 51017504 glyveg / 17-6783-9752

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

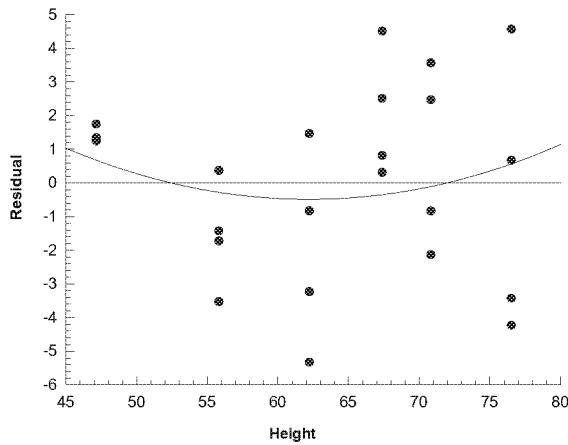
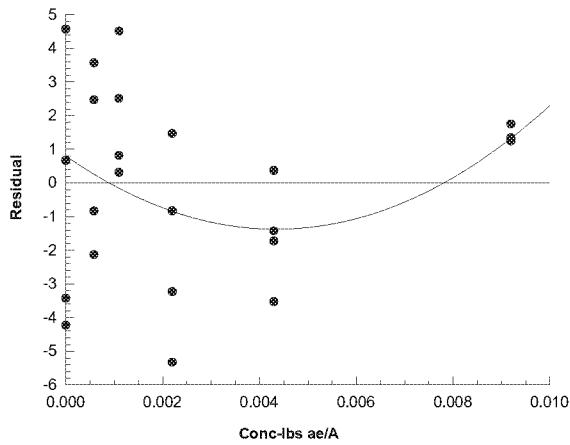
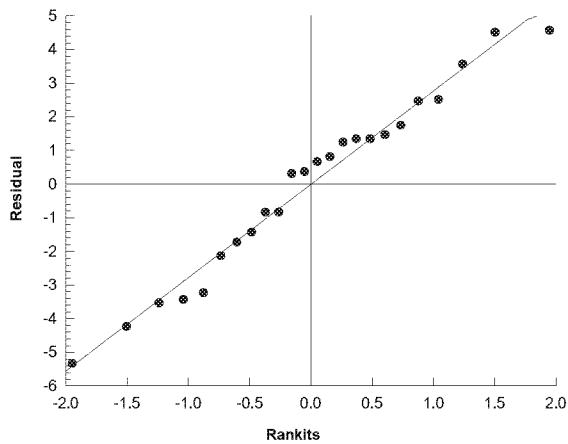
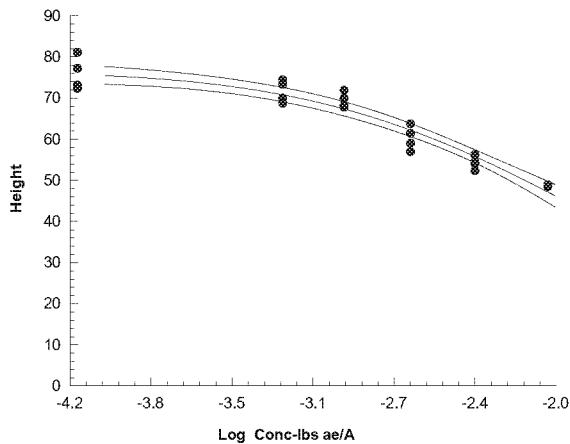
Analysis ID: 14-5028-3139  
 Analyzed: 07 Apr-20 19:23

Endpoint: Height  
 Analysis: Nonlinear Regression (NLR)

CETIS Version: CETISv1.9.5  
 Status Level: 1

### Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]



# CETIS Analytical Report

Report Date: 07 Apr-20 19:25 (p 3 of 4)  
 Test Code/ID: 51017504 glyveg / 17-6783-9752

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)				Stoneville R&D, Inc.	
Analysis ID: 08-6580-3612	Endpoint: Weight				CETIS Version: CETISv1.9.5
Analyzed: 07 Apr-20 19:23	Analysis: Nonlinear Regression (NLR)				Status Level: 1
Batch ID: 08-5153-4444	Test Type: Vegetative Vigor Tier II				Analyst:
Start Date: 27 Jun-19 00:01	Protocol: OCSPP 850.4150 Plant Vegetative Vigor				Diluent:
Ending Date:	Species: Glycine max				Brine:
Test Length: n/a	Taxon:				Source: Age: V4

## Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha [1 - \Phi[\log[x/\delta]/\gamma]]$	Normal [ $\omega=1$ ]	Off [ $\mu^*=\mu$ ]	None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSE	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
8	-128	263	266	0.4464	4.96%	4520	Yes	2.06	0.1412	Non-Significant Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.00087	0.000158	0.00237
IC10	0.00398	0.00204	0.00693
IC25	0.0504	0.00429	0.283
IC50	0.848	0.00493	146

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	4520	108	4290	4740	41.9	<1.0E-37	Significant Parameter
$\gamma$	4.18	1.68	0.685	7.68	2.49	0.0214	Significant Parameter
$\delta$	0.848	1.63	-2.54	4.24	0.52	0.6087	Non-Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	425000000	142000000	3	2980	<1.0E-37	Significant
Lack of Fit	255000	84900	3	2.06	0.1412	Non-Significant
Pure Error	742000	41200	18			
Residual	996000	47400	21			

## Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Outlier	Grubbs Extreme Value Test	2.57	2.8	0.1353	No Outliers Detected
Variance	Bartlett Equality of Variance Test	4.07	11.1	0.5393	Equal Variances
	Mod Levene Equality of Variance	0.572	2.77	0.7206	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.395	2.49	0.3775	Normal Distribution
	Shapiro-Wilk W Normality Test	0.956	0.917	0.3717	Normal Distribution

## Weight Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	4510	4200	4750	118	236	5.23%	0.0%
0.00058		4	4420	4320	4500	41.8	83.7	1.89%	2.0%
0.0011		4	4120	3890	4350	93.3	187	4.53%	8.6%
0.0022		4	4310	4030	4510	102	204	4.72%	4.38%
0.0043		4	3930	3510	4160	147	294	7.49%	12.8%
0.0092		4	3920	3800	4140	73.7	147	3.75%	12.9%

# CETIS Analytical Report

Report Date: 07 Apr-20 19:25 (p 4 of 4)  
Test Code/ID: 51017504 glyveg / 17-6783-9752

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

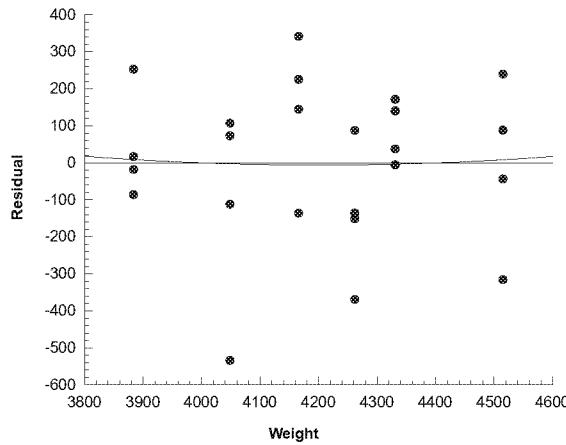
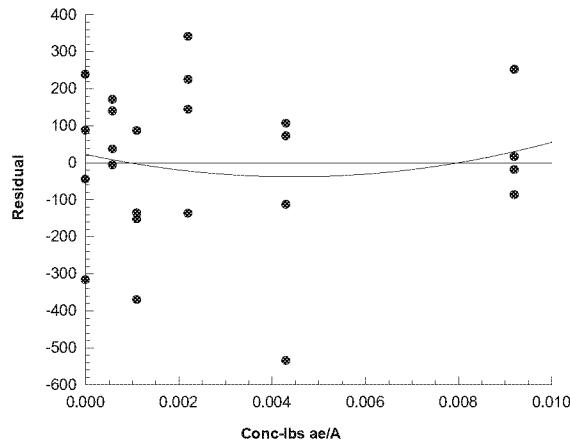
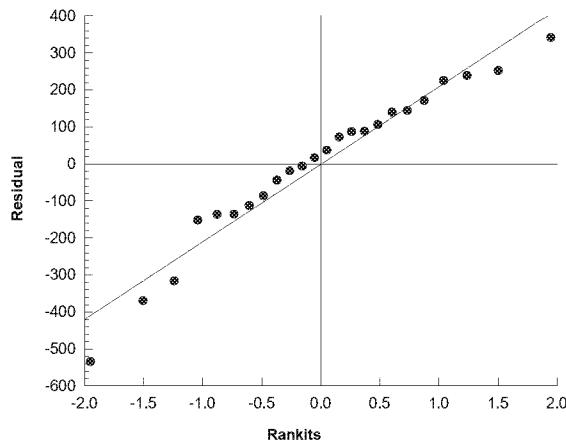
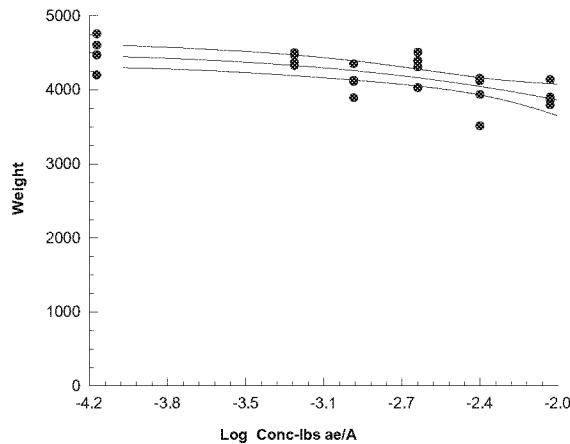
Analysis ID: 08-6580-3612  
Analyzed: 07 Apr-20 19:23

Endpoint: Weight  
Analysis: Nonlinear Regression (NLR)

CETIS Version: CETISv1.9.5  
Status Level: 1

### Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]



# CETIS Analytical Report

Report Date: 21 May-20 23:21 (p 1 of 2)  
 Test Code/ID: 51017504 glyv14 / 18-9013-8505

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

Analysis ID:	19-3845-6607	Endpoint:	Height	CETIS Version:	CETISv1.9.6
Analyzed:	21 May-20 23:16	Analysis:	Nonlinear Regression (NLR)	Status Level:	1
Batch ID:	00-8031-0401	Test Type:	Vegetative Vigor Tier II	Analyst:	
Start Date:	27 Jun-19 00:01	Protocol:	OCSPP 850.4150 Plant Vegetative Vigor	Diluent:	
Ending Date:	21 May-20 22:36	Species:	Glycine max	Brine:	
Test Length:	329d 23h	Taxon:		Source:	Age:
Sample ID:	14-6061-2147	Code:	570F2C33	Project:	
Sample Date:	27 Jun-19	Material:	Glyphosate	Source:	Monsanto Company
Receipt Date:	21 May-20 22:36	CAS (PC):		Station:	
Sample Age:	1m	Client:	CDM Smith - K. Bozicevich		

### Non-Linear Regression Options

Model Name and Function				Weighting Function			PTBS Function		X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$				Normal [ $\omega=1$ ]			Off [ $\mu^*=\mu$ ]		None	None

### Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSD	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
5	-21.23	49.66	51.99	0.8961	5.62%	43.42	Yes	1.965	0.1554	Non-Sig Lack of Fit

### Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.0005465	0.0002303	0.0008664
IC10	0.001026	0.0006813	0.001402
IC15	0.001568	0.001161	0.002023
IC20	0.002198	0.00173	0.002723
IC25	0.002936	0.002406	0.003531
IC40	0.006089	0.005069	0.007279
IC50	0.009444	0.007429	0.01201

### Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	43.42	1.174	40.98	45.86	36.99	<1.0E-37	Significant Parameter
$\gamma$	1.732	0.2302	1.254	2.211	7.526	2.2E-07	Significant Parameter
$\delta$	0.009444	0.001138	0.007077	0.01181	8.296	<1.0E-37	Significant Parameter

### ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	30500	10170	3	1583	<1.0E-37	Significant Effect
Lack of Fit	33.28	11.09	3	1.965	0.1554	Non-Significant Effect
Pure Error	101.6	5.645	18			
Residual	134.9	6.424	21			

### Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Variance	Bartlett Equality of Variance Test	1.612	11.07	0.8999	Equal Variances
	Mod Levene Equality of Variance	0.2809	2.773	0.9175	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.2937	2.492	0.6308	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9697	0.9169	0.6604	Normal Distribution

### Height Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	43.5	41	44.9	0.8573	1.715	3.94%	0.0%
0.00058		4	39.75	37.5	42.3	1.014	2.027	5.10%	8.62%
0.0011		4	40.68	37.7	42.8	1.213	2.425	5.96%	6.49%
0.0022		4	34.9	29.9	37.2	1.702	3.405	9.76%	19.77%
0.0043		4	27.8	25	30.5	1.154	2.308	8.30%	36.09%
0.0092		4	22.7	20.6	25.4	1.002	2.005	8.83%	47.82%

# CETIS Analytical Report

Report Date: 21 May-20 23:21 (p 2 of 2)  
 Test Code/ID: 51017504 glyv14 / 18-9013-8505

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

Analysis ID: 19-3845-6607  
 Analyzed: 21 May-20 23:16

Endpoint: Height  
 Analysis: Nonlinear Regression (NLR)

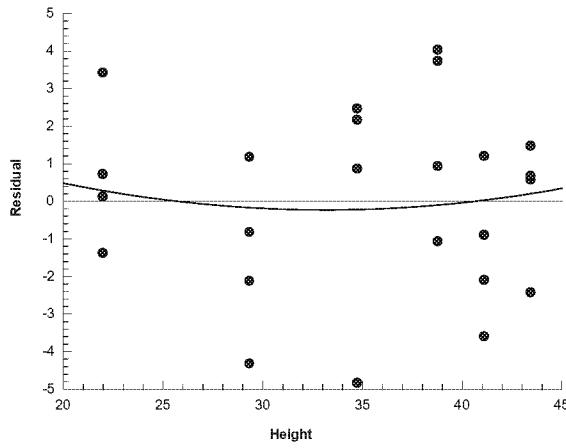
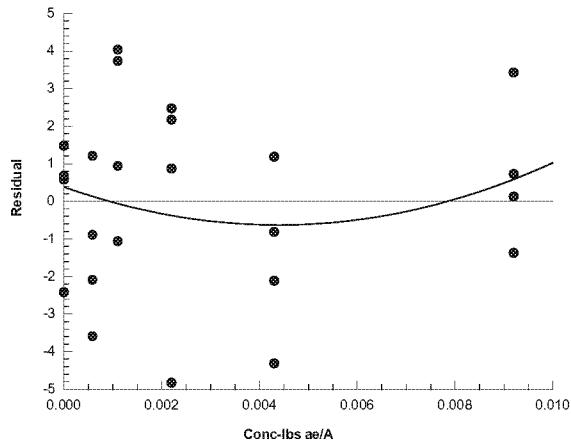
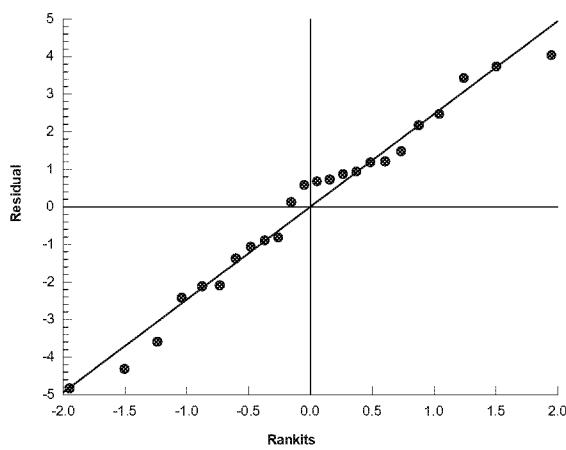
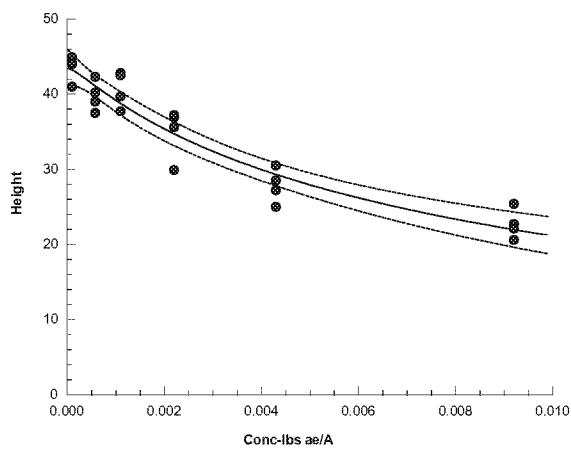
CETIS Version: CETISv1.9.6  
 Status Level: 1

### Height Detail

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	44	41	44.9	44.1
0.00058		37.5	39	40.2	42.3
0.0011		37.7	42.8	42.5	39.7
0.0022		36.9	35.6	37.2	29.9
0.0043		27.2	25	30.5	28.5
0.0092		25.4	22.7	20.6	22.1

### Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu = \alpha [1 - \Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]



# CETIS Analytical Report

Report Date: 21 May-20 23:20 (p 1 of 2)  
 Test Code/ID: 51017504 glyr14 / 03-6583-4785

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)					Stoneville R&D, Inc.	
Analysis ID: 21-4731-8262	Endpoint: Height				CETIS Version: CETISv1.9.6	
Analyzed: 21 May-20 23:19	Analysis: Nonlinear Regression (NLR)				Status Level: 1	
Batch ID: 00-7445-1466	Test Type: Vegetative Vigor Tier II				Analyst:	
Start Date: 11 Jul-19 00:01	Protocol: OCSPP 850.4150 Plant Vegetative Vigor				Diluent:	
Ending Date: 21 May-20 22:36	Species: Glycine max				Brine:	
Test Length: 315d 23h	Taxon:				Source:	Age:
Sample ID: 20-2031-8314	Code: 786B9C6A				Project:	
Sample Date: 11 Jul-19	Material: Glyphosate				Source: Monsanto Company	
Receipt Date: 21 May-20 22:36	CAS (PC):				Station:	
Sample Age: 1m	Client: CDM Smith - K. Bozicevich					

## Non-Linear Regression Options

Model Name and Function		Weighting Function		PTBS Function		X Trans	Y Trans
3P Cum Log-Normal (Probit): $\mu = \alpha \cdot [1 - \Phi[\log[x/\delta]/\gamma]]$		Normal [ $\omega=1$ ]		Off [ $\mu^*=\mu$ ]		None	None

## Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	PMSD	Thresh	Optimize	F Stat	P-Value	Decision( $\alpha:5\%$ )
11	-34.85	76.9	79.24	0.8360	5.59%	79.08	Yes	2.781	0.0708	Non-Sig Lack of Fit

## Point Estimates

Level	Ibs ae/A	95% LCL	95% UCL
IC5	0.0005496	0.0001917	0.000971
IC10	0.001208	0.0007349	0.001771
IC15	0.002055	0.001456	0.00276
IC20	0.003134	0.00241	0.003977
IC25	0.004502	0.003584	0.005571
IC40	0.01122	0.008025	0.01548
IC50	0.01942	0.01214	0.03108

## Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision( $\alpha:5\%$ )
$\alpha$	79.08	2.125	74.66	83.5	37.21	<1.0E-37	Significant Parameter
$\gamma$	2.167	0.3642	1.41	2.925	5.951	6.6E-06	Significant Parameter
$\delta$	0.01942	0.004167	0.01076	0.02809	4.661	1.3E-04	Significant Parameter

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha:5\%$ )
Model	108600	36210	3	1811	<1.0E-37	Significant Effect
Lack of Fit	133	44.32	3	2.781	0.0708	Non-Significant Effect
Pure Error	286.9	15.94	18			
Residual	419.8	19.99	21			

## Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision( $\alpha:5\%$ )
Variance	Bartlett Equality of Variance Test	4.323	11.07	0.5039	Equal Variances
	Mod Levene Equality of Variance	1.482	2.773	0.2445	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.5346	2.492	0.1750	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9349	0.9169	0.1256	Normal Distribution

## Height Summary

Conc-lbs ae/A	Code	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	78.35	70.5	83.5	2.896	5.791	7.39%	0.0%
0.0006		4	74.32	70.7	78.2	1.756	3.512	4.73%	5.14%
0.0012		4	75.02	71.8	76.9	1.13	2.26	3.01%	4.24%
0.0024		4	64.7	61.8	67.8	1.229	2.458	3.80%	17.42%
0.0046		4	55.55	49.3	62.1	2.751	5.502	9.91%	29.1%
0.0099		4	51.28	47.9	54.1	1.442	2.885	5.63%	34.56%

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&amp;D, Inc.

Analysis ID: 21-4731-8262

Endpoint: Height

CETIS Version: CETISv1.9.6

Analyzed: 21 May-20 23:19

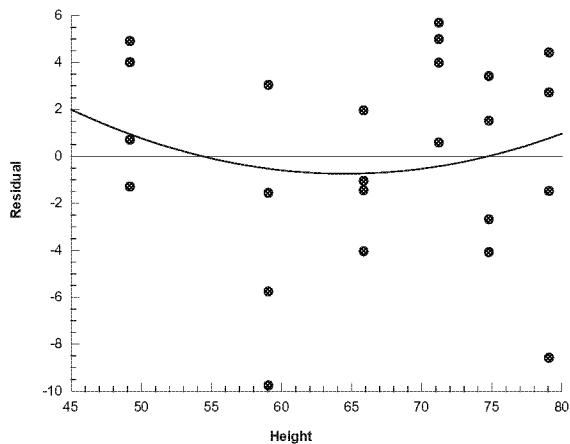
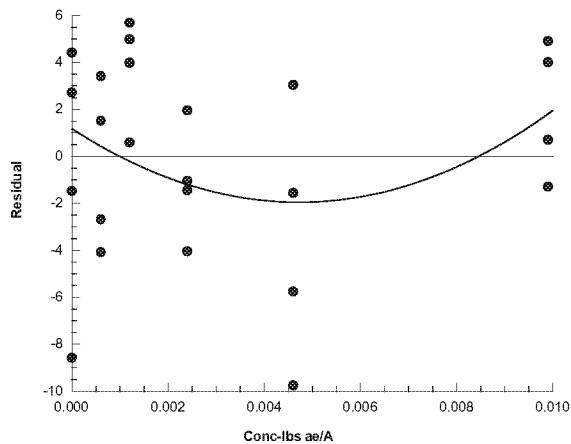
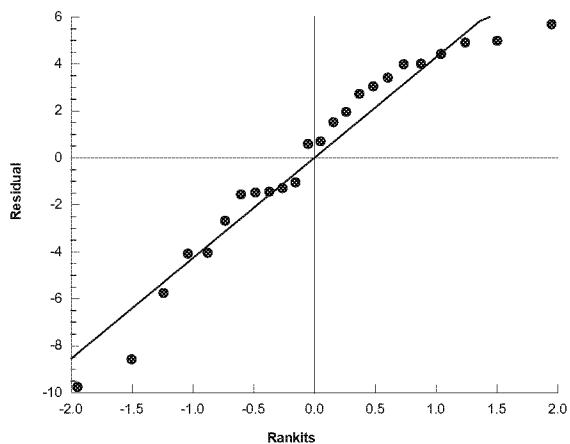
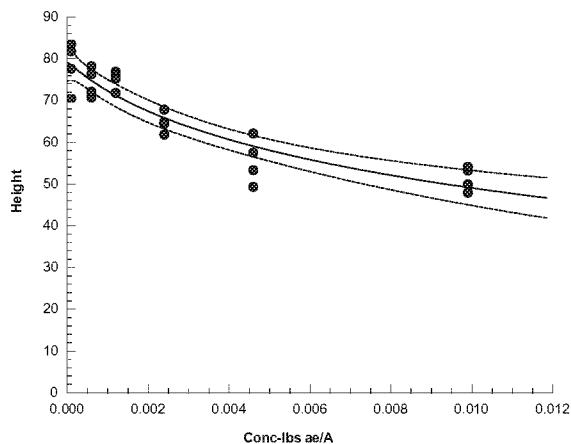
Analysis: Nonlinear Regression (NLR)

Status Level: 1

## Height Detail

Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	77.6	70.5	83.5	81.8
0.0006		70.7	78.2	72.1	76.3
0.0012		71.8	76.9	76.2	75.2
0.0024		61.8	64.8	64.4	67.8
0.0046		49.3	62.1	57.5	53.3
0.0099		53.2	54.1	49.9	47.9

## Graphics

Model: 3P Cum Log-Normal (Probit):  $\mu=\alpha[1-\Phi[\log[x/\delta]/\gamma]]$  Distribution: Normal [ $\omega=1$ ]

# CETIS Analytical Report

Report Date: 21 May-20 23:21 (p 1 of 2)  
 Test Code/ID: 51017504 glyv14 / 18-9013-8505

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)							Stoneville R&D, Inc.					
Analysis ID:		Endpoint: Height			CETIS Version:		CETISv1.9.6					
Analyzed:		Analysis: Parametric-Control vs Ord.Treatments			Status Level:		1					
Batch ID:	00-8031-0401	Test Type: Vegetative Vigor Tier II			Analyst:							
Start Date:	27 Jun-19 00:01	Protocol: OCSPP 850.4150 Plant Vegetative Vigor			Diluent:							
Ending Date:	21 May-20 22:36	Species: Glycine max			Brine:							
Test Length:	329d 23h	Taxon:			Source:							
Sample ID:	14-6061-2147	Code: 570F2C33			Age:							
Sample Date:	27 Jun-19	Material: Glyphosate			Project:							
Receipt Date:	21 May-20 22:36	CAS (PC):			Source: Monsanto Company							
Sample Age:	1m	Client: CDM Smith - K. Bozicevich			Station:							
Data Transform		Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD			
Untransformed		C > T			<0.00058	0.00058	n/a	7.21%				
Williams Multiple Comparison Test												
Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )			
Negative Control	0.00058*	2.232	1.734	2.913	6	CDF	<0.05	Significant Effect				
	0.0011*	1.957	1.818	3.054	6	CDF	<0.05	Significant Effect				
	0.0022*	5.119	1.845	3.1	6	CDF	<0.05	Significant Effect				
	0.0043*	9.345	1.859	3.123	6	CDF	<0.05	Significant Effect				
	0.0092*	12.38	1.867	3.137	6	CDF	<0.05	Significant Effect				
ANOVA Table												
Source	Sum Squares		Mean Square		DF	F Stat		P-Value	Decision( $\alpha:5\%$ )			
Between	1320.33		264.066		5	46.78		<1.0E-37	Significant Effect			
Error	101.618		5.64542		18							
Total	1421.95				23							
ANOVA Assumptions Tests												
Attribute	Test			Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )					
Variance	Bartlett Equality of Variance Test			1.612	15.09	0.8999	Equal Variances					
Distribution	Shapiro-Wilk W Normality Test			0.9407	0.884	0.1693	Normal Distribution					
Height Summary												
Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
0	N	4	43.5	40.77	46.23	44.05	41	44.9	0.8573	3.94%	0.00%	
0.00058		4	39.75	36.52	42.98	39.6	37.5	42.3	1.014	5.10%	8.62%	
0.0011		4	40.68	36.82	44.53	41.1	37.7	42.8	1.213	5.96%	6.49%	
0.0022		4	34.9	29.48	40.32	36.25	29.9	37.2	1.702	9.76%	19.77%	
0.0043		4	27.8	24.13	31.47	27.85	25	30.5	1.154	8.30%	36.09%	
0.0092		4	22.7	19.51	25.89	22.4	20.6	25.4	1.002	8.83%	47.82%	
Height Detail												
Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4							
0	N	44	41	44.9	44.1							
0.00058		37.5	39	40.2	42.3							
0.0011		37.7	42.8	42.5	39.7							
0.0022		36.9	35.6	37.2	29.9							
0.0043		27.2	25	30.5	28.5							
0.0092		25.4	22.7	20.6	22.1							

# CETIS Analytical Report

Report Date: 21 May-20 23:21 (p 2 of 2)  
Test Code/ID: 51017504 glyv14 / 18-9013-8505

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

Analysis ID: 10-4708-3582

Endpoint: Height

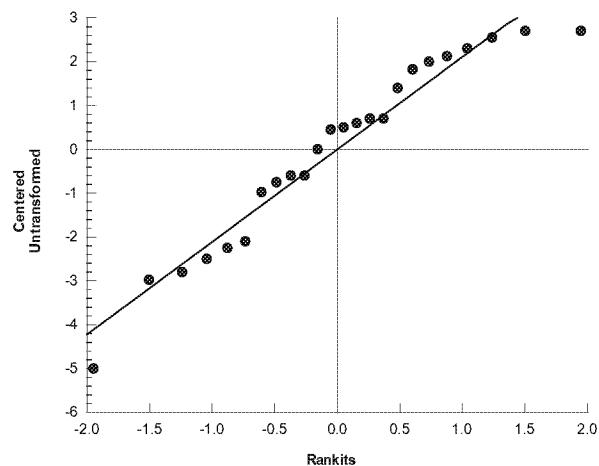
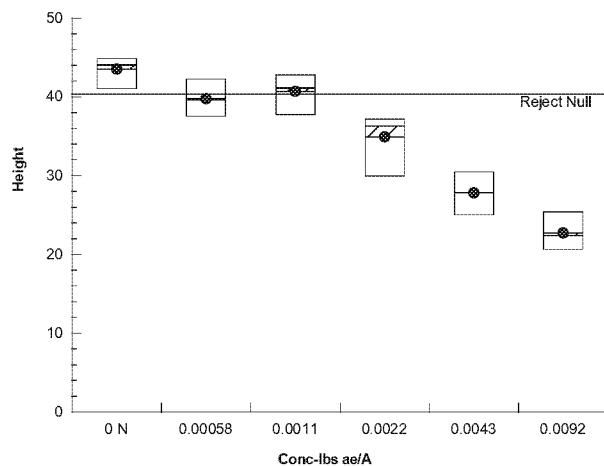
Analyzed: 21 May-20 23:12

Analysis: Parametric-Control vs Ord.Treatments

CETIS Version: CETISv1.9.6

Status Level: 1

### Graphics



# CETIS Analytical Report

Report Date: 21 May-20 23:20 (p 1 of 2)  
 Test Code/ID: 51017504 glyr14 / 03-6583-4785

OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)							Stoneville R&D, Inc.					
Analysis ID:		Endpoint: Height			CETIS Version:		CETISv1.9.6					
Analyzed:		Analysis: Parametric-Control vs Ord.Treatments			Status Level:		1					
Batch ID:	00-7445-1466	Test Type: Vegetative Vigor Tier II			Analyst:							
Start Date:	11 Jul-19 00:01	Protocol: OCSPP 850.4150 Plant Vegetative Vigor			Diluent:							
Ending Date:	21 May-20 22:36	Species: Glycine max			Brine:							
Test Length:	315d 23h	Taxon:			Source:							
Sample ID:	20-2031-8314	Code: 786B9C6A			Age:							
Sample Date:	11 Jul-19	Material: Glyphosate			Project:							
Receipt Date:	21 May-20 22:36	CAS (PC):			Source: Monsanto Company							
Sample Age:	1m	Client: CDM Smith - K. Bozicevich			Station:							
Data Transform		Alt Hyp			NOEL	LOEL	TOEL	TU	PMSD			
Untransformed		C > T			0.0012	0.0024	0.001697		6.73%			
Williams Multiple Comparison Test												
Control	vs	Conc-lbs ae/	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision( $\alpha:5\%$ )			
Negative Control	0.0006		1.426	1.734	4.895	6	CDF	>0.05	Non-Significant Effect			
	0.0012		1.302	1.818	5.132	6	CDF	>0.05	Non-Significant Effect			
	0.0024*		4.836	1.845	5.208	6	CDF	<0.05	Significant Effect			
	0.0046*		8.077	1.859	5.248	6	CDF	<0.05	Significant Effect			
	0.0099*		9.591	1.867	5.27	6	CDF	<0.05	Significant Effect			
ANOVA Table												
Source	Sum Squares		Mean Square		DF	F Stat		P-Value	Decision( $\alpha:5\%$ )			
Between	2517.05		503.411		5	31.59		<1.0E-37	Significant Effect			
Error	286.862		15.9368		18							
Total	2803.92				23							
ANOVA Assumptions Tests												
Attribute	Test			Test Stat	Critical	P-Value	Decision( $\alpha:1\%$ )					
Variance	Bartlett Equality of Variance Test			4.323	15.09	0.5039	Equal Variances					
Distribution	Shapiro-Wilk W Normality Test			0.9815	0.884	0.9217	Normal Distribution					
Height Summary												
Conc-lbs ae/A	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
0	N	4	78.35	69.14	87.56	79.7	70.5	83.5	2.896	7.39%	0.00%	
0.0006		4	74.32	68.74	79.91	74.2	70.7	78.2	1.756	4.73%	5.14%	
0.0012		4	75.02	71.43	78.62	75.7	71.8	76.9	1.13	3.01%	4.24%	
0.0024		4	64.7	60.79	68.61	64.6	61.8	67.8	1.229	3.80%	17.42%	
0.0046		4	55.55	46.79	64.31	55.4	49.3	62.1	2.751	9.91%	29.10%	
0.0099		4	51.28	46.68	55.87	51.55	47.9	54.1	1.442	5.63%	34.56%	
Height Detail												
Conc-lbs ae/A	Code	Rep 1	Rep 2	Rep 3	Rep 4							
0	N	77.6	70.5	83.5	81.8							
0.0006		70.7	78.2	72.1	76.3							
0.0012		71.8	76.9	76.2	75.2							
0.0024		61.8	64.8	64.4	67.8							
0.0046		49.3	62.1	57.5	53.3							
0.0099		53.2	54.1	49.9	47.9							

# CETIS Analytical Report

Report Date: 21 May-20 23:20 (p 2 of 2)  
Test Code/ID: 51017504 glyr14 / 03-6583-4785

## OCSPP 850.4150 Terrestrial Plant Tier II (Vegetative Vigor)

Stoneville R&D, Inc.

Analysis ID: 07-4692-8893  
Analyzed: 21 May-20 23:09

Endpoint: Height  
Analysis: Parametric-Control vs Ord.Treatments

CETIS Version: CETISv1.9.6  
Status Level: 1

### Graphics

